Bibliotheca Herpetologica

A Journal of the History and Bibliography of Herpetology

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International Society for the History and Bibliography of Herpetology

The Society

Mission. The ISHBH aims to promote research related to historical herpetology. The Society is devoted to stimulating and advancing the study of the history of the herpetological discipline and its bibliography. We bring together individuals for whom the history and bibliography of herpetology are appealing. We promote the knowledge of these and related topics among members and the general public. The Society was established in 1998. Membership is open to anyone who shares the aims of the Society.

Activities. The society members meet every year, usually in connection with other general herpetological meetings with international participation. Activities include visits to private and public libraries, museums and other places with historical links to the discipline. We organize workshops and sessions in the fields that form parts of larger national or international meetings on herpetology. Our shared lunches adjacent to the yearly business meetings have become popular among members and guests. The Society works to facilitate both formal and informal contacts among members.

Journal. The ISHBH publishes the journal *Bibliotheca Herpetologica*, which is the central pillar of the Society. It contains articles, essays, bibliographies and news of people and events in our field and is a peer-reviewed. The many important contributions make the publication a vital source for bibliographers, historians and taxonomists alike but at the same time the papers are by and large appealing to the layperson in the field.

Beginning with volume 14, ISHBH will adopt an open access publication model. Articles in Bibliotheca Herpetologica will be available online as soon as they receive final editorial approval. At the end of the year a hard copy version of Bibliotheca Herpetologica, containing all articles published that year, will be printed and distributed to current members.

The name of the journal, up to volume 5(1), was: *International Society for the History and Bibliography of Herpetology Newsletter and Bulletin*.

Membership. The new membership fees take effect in 2021. ISHBH membership categories are: Corresponding Membership US$25/year (open access only plus all other membership benefits), Regular Membership US$50/year, Institutional Memberships US$75/year, and Sponsoring US$75/year. Note that Life Members will retain their status. However, we are no longer offering new Life Memberships. To Join, go to our website http://www.ishbh.com and click on the Membership tab.

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From the Chairman

Volume 14 of *Bibliotheca Herpetologica* is out! Thanks to the support and interest of many members, the ISHBH has rebounded from a precarious position following the loss of its founding Chairman, Richard Wahlgren, and co-editor Joseph Mitchell in 2019. In just a few short months, enough papers to fill an issue have been reviewed and published online, marking a change in the society's publishing strategy. Moving forward, we aim to continue to provide hardcopy journals, which remain popular with our members, but also to stay true to our new open access model which, along with our growing social media presence, will promote our collective interest in the history and bibliography of herpetology to a broader audience. We must encourage the recruitment of a more diverse (and younger) membership if we are to survive. It is perhaps a paradox that the promotion of the appreciation of antiquarian books is now dependent on the tools of a digital world, but people only care about the things they know and in the modern world knowing begins online. The recent auction of the finer items of Richard Wahlgren's library marks, as well as anything, the turning of the page for the ISHBH. The successful auction demonstrates that interest in books (and the authors and histories behind them) remains strong. Some high-end items went for impressive prices, but others were bargains and I know that at least some items were won by students, which bodes well for the future of the ISHBH. I believe the future of the ISHBH is bright and I encourage everyone to participate as actively as possible. Spread the word about our society, sign up for the ISHBH mailing list and register for email alerts and encourage others to do so, and, if you are able, consider writing something for *Bibliotheca Herpetologica*. All best wishes for the coming new year.

Aaron M. Bauer, Chairman
Villanova, Pennsylvania, USA

From the Editor

This volume of *Bibliotheca Herpetologica* marks a milestone for the International Society for the History and Bibliography of Herpetology (ISHBH), not in the traditional sense, but a milestone in resilience and commitment to the dissemination of information pertaining to the history and bibliography of herpetology. The untimely deaths of Joseph Mitchell, a co-editor, in July 2019, followed shortly thereafter by the death of Richard Wahlgren in October could have easily marked the end of ISHBH. Since its inception, ISHBH relied heavily upon Richard Wahlgren's direction and involvement. Fortunately Aaron Bauer sent out some emails during the summer of 2020 to determine the level of interest in keeping the society going. Needless to say the response was overwhelmingly in favor of both maintaining the society and trying to make the society more vibrant and appealing to the average herpetologist. This volume of *Bibliotheca Herpetologica* represents the beginning of this effort.

Shortly after becoming editor, I received an email from Thomas Malm with a paper he had originally submitted in 2017 (see Malm this volume, issue 1). Regrettably, with no other papers having been submitted, the paper remained unpublished. One of the first things the new Board did was to make *Bibliotheca Herpetologica* open access. In order to shorten the publishing time for authors, while maintaining bibliographic consistency, each paper is now being published online immediately after acceptance, with the date of publication included on the first page of the PDF. In the print copy of each journal, papers will appear in the order they were published, with continuous pagination (same as in the PDFs). Any additional material, such as this letter and the 'about the cover' description, will be included at the beginning of the printed copy, but with Roman numeral pagination.

As for the content of the journal, both history and bibliography are extremely broad categories, even when restricted to herpetology. At least that is my interpretation. As editor I hope to expand the types of papers published. Over the last three months we have gone from having a sole paper submitted three years ago, to having ten published papers, plus two more in review and several others in progress. Clearly there has been a need for *Bibliotheca Herpetologica* that the open access model has exposed. To ensure *Bibliotheca Herpetologica* and the ISHBH continue to grow, I would like to invite everyone to consider what they have to contribute.

Some of the types of papers I would like to see submitted include: personal histories, that is autobiographies and biographies as well as essays about specific events (expeditions, discoveries, etc.); histories of institutions or collections; histories of aspects of herpetology; annotated bibliographies; and topics for which herpetology plays a historical role, even if it is only a minor one. Of course there is always a need for book reviews and people willing to review books.

Another benefit of our open access model is that color is no longer a limiting factor. Unlike many journals that want short papers often limiting important information and sacrificing bibliographic citations, ISHBH wants papers to fully explore a topic, offering complete bibliographic citations for readers. Our online 'References' sections now include links to the open access publications cited in the paper. We have purposely excluded links to any papers that require a login or payment to reduce frustration for those members who may not have access to them. For papers whose length extends beyond what can conveniently fit within the journal model, ISHBH will be establishing a monograph series titled *Wahl-*

greniana in honor of Richard Wahlgren. We currently have one submission for this new series and are working on a couple of others. Here again, I would like to invite people to consider ISHBH as the publisher for your book length works relating to any aspect of herpetological history or bibliography.

The ISHBH Board, largely made up of previous Board members and long-term ISHBH members, have taken important steps to make ISHBH more appealing to a diverse group of herpetologists. Not only has the publishing format of *Bibliotheca Herpetologica* become more accessible, ISHBH has a new website which is being updated on a regular basis, and the ISHBH Facebook page has been revitalized. Regardless of how much the Board does, we are still lacking in overall diversity—international diversity, age and gender diversity, as well as cultural diversity. I think I speak for the entire Board when I say we all have a strong desire for ISHBH to become more diverse. It is only through diversity that we can approach our goal of representing the whole of herpetological history and bibliography.

As one final invitation, I would like to invite anyone and everyone with an interest in herpetological history and bibliography to become involved in the society. Not just as members, but as active participants. There are surely needs the society could fulfill that the current Board doesn't even know exist, let alone how to accomplish them. You should not feel that a Ph.D. in Herpetology is required. I for one do not have any post-graduate degree. I certainly can't claim to have the qualifications to be an editor based on my knowledge of writing mechanics or grammar. What I do have is enthusiasm for the subject and a desire to learn more—that's really all that is required for any ISHBH position or of the author of any paper published in *Bibliotheca Herpetologica.*

I look forward to seeing what volume 15 has to offer. If this volume is any indication, it will offer papers on a range of topics of interest to herpetologists as well as non-herpetologists. Please help spread the word about ISHBH by recommending the papers to people who may not otherwise hear about them.

Breck Bartholomew, Editor
Salt Lake City, Utah, USA

About The Cover

Edward Orme (1775- ca 1848) was an engraver and painter who produced 700 etchings and book plates. He was an engraver to both King George III from 1799 to 1820, and to the Prince of Wales from 1799 to 1830. Orme opened a shop as a printmaker on Conduit Street in Mayfair in 1800. A year later, in 1801, he opened another shop on the corner of New Bond Street and Brook Street. He published many books of aquatints (a print resembling a watercolor, produced from a copper plate etched with nitric acid) and etchings. His art was included the 1819 book *Foreign Field Sports, Fisheries, Sporting Anecdotes from Drawings by Messrs. Howitt, Atkinson, Clark, Manskirch, & C. With a supplement of New South Wales* which contained 110 plates. The plates were based on sketches and the stories were provided by travelers. Seven of the plates contain reptiles. He closed his print shop in 1824. He also spent part of his career as a real estate developer. For more on Edward Orme see the British Museum account https://www.britishmuseum.org/collection/term/BIOG40705.

> The Guana is a species of the Lacerta, or Lizard tribe; under which genus is included all the varieties of crocodiles and alligators. The great American Guana is generally of a green colour; its back exhibits the appearance of a saw, and it is distinguished by a pouch under the throat, which it is able to expand or contract at pleasure, and which gives it an appearance truly formidable. It is, however, perfectly inoffensive. It inhabits rocks and woods, and subsists on vegetable food, as well as on certain species of insects. It deposits its eggs in the earth, where they are hatched by the heat of the sun; they are remarkable for having no testaceous covering, and are much valued for food.
>
> The Guana is very common in Surinam, in the woods of Guiana, in Cayenne, and in Mexico. In the West India islands, the flesh is much esteemed, and is even preferred to poultry. It is made an article Of trade in the Bahamas, and is carried alive to Carolina and other parts of America, where the flesh is salted, and kept for use. The Guana is easily distinguished from all the tribe of lizards, by the large pouch above mentioned, as well as by the serrated crest, which reaches from the head to the extremity of its tail. It is sometimes five or six feet in length, is covered with small scales of various colours, and appears as if highly varnished. It is taken by the following artifice a man, with a long stick, having a cord at its extremity, formed in a running noose, ascends a tree, where a Guana has extended itself on a branch, to bask in the beams of the sun. The man advances cautiously, whistling in a particular manner; the animal seems to be pleased with the sound, and raises its head, as if listening; the man gradually approaches, still whistling, and begins by tickling the sides and throat of the Guana with his stick, to induce it to assume such a position, that he may slip the noose over its head; which is no sooner done than he gives it a sudden jerk, and causes it to fall to the ground, when he dispatches it. The Guana, in America, is also taken by dogs, which are trained to the chase. In the Bahama islands, the dogs are so well disciplined, that they will take them alive.

John Murphy
Green Valley, Arizona, USA

International Society for the History and Bibliography of Herpetology
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A Footnote to Scandinavian Herpetology: Gunnar Olof Hyltén-Cavallius and his Quest for the Dragon or Lindworm

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Abstract. Gunnar Olof Hyltén-Cavallius (1818–1889) was a pioneer in Swedish ethnology. His booklet *Om Draken eller Lindormen* [On the Dragon or Lindworm], a memorandum to the Royal Swedish Academy of Sciences, first printed in 1884 with a second revised edition in 1885, was intended as a contribution to natural science as well as ethnology. After having collected numerous eyewitness accounts, he concluded that a snake, known for hundreds of years as a *drake* [dragon], *lindorm* [lindworm], or *hjulorm* [hoop snake], up to six meters long and "thick as a man's leg," sometimes also with long hair or scales on its neck looking like a horse's mane, still existed in the Swedish forests. This article describes his unsuccessful attempts to obtain a type specimen and interest naturalists in his project.

Keywords: Gunnar Olof Hyltén-Cavallius, dragon, lindworm, lindorm, serpent dragon, cryptozoology, cryptid, ethnology, Royal Swedish Academy of Sciences

Introduction

In connection with the bicentenary of the birth of ethnologist Gunnar Olof Hyltén-Cavallius (18 May 1818–5 July 1889) (Fig. 1), I edited a third edition of his booklet *Om Draken eller Lindormen* [On the Dragon or Lindworm], providing illustrations and extensive annotations (Hyltén-Cavallius & Malm, 2017). 'On the Dragon or Lindworm' was privately printed in two editions by Hyltén-Cavallius, in 1884 and 1885, as a memorandum to the Royal Swedish Academy of Sciences. Although intended as a contribution to natural as well as cultural history, his collection of eyewitness accounts also became a pioneering work in cryptozoology, the science—many would say "pseudoscience"—of cryptids, or undiscovered animals.

It was not until 1959 and 1983, respectively, that the terms 'cryptozoology' and 'cryptid' first appeared in the literature (Rossi, 2015: 573, 577). A number of zoologists had, however, long before that collected data about mysterious creatures. One of them was Anthonie Cornelis Oudemans (1858–1943), a Dutchman, who during the years 1889–1892 brought together depictions of huge sea snakes (Eyndhoven, 1944: 3). His exhaustive treatise, *The Great Sea-Serpent* (Oudemans, 1892), in which he argued that the animal in question was an unknown kind of seal, *Megophias megophias* (= big snake), was published in English (and, revised by Anton Stuxberg [1849–1902], in Swedish 1896). It is today regarded as a foundation of cryptozoology. Although Hyltén-Cavallius' publication preceded Oudemans' by eight years, it has remained largely unknown, or at least unread, by herpetologists and cryptozoologists outside Scandinavia (for an exception see Meurger, 1996). The obvious reason is that it has only been available in Swedish, rather than that a zoologist did not write it.

It might, therefore, be a good idea to let an international readership know about Hyltén-Cavallius and his "crypto-herpetological" project about the 'serpent dragon' as we can call the elusive reptile in order to avoid the cumbersome expression "the dragon, lindworm, or hoop snake" and confusion with the mostly two- or four-footed winged dragons of medieval thought. The word *drakorm*, which is Swedish for 'serpent dragon,' was mentioned by some of Hyltén-Cavallius' informants and is also used in contemporary archaeology (e.g., see Johansen, 1997).

To be more precise, there are two questions to be dealt with here from biographical and bibliographical points of view: (1) why Hyltén-Cavallius, as an ethnologist, took it upon himself to try to convince natural scientists that a giant snake existed in Sweden, and (2) how his booklet was perceived by contemporary zoologists and cultural historians.

From Ethnologist to Cryptozoologist

Hyltén-Cavallius was an ageing and crippled, but by no means feeble-minded, scholar when he compiled the report about the serpent dragon. He was born in Vislanda, a parish in the province of Småland, southern Sweden, as the son of a rural dean and his wife. At an early age he became interested in documenting before it was too late, the rapidly changing or disappearing local traditions that he regarded as important. In his autobiography (Hyltén-Cavallius, 1929, dated 1882) he describes how he first studied in the cathedral city of Växjö. Then at Uppsala University where he took his M.A. degree, having written a thesis about the local dialect of his

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Fig. 1. Gunnar Olof Hyltén-Cavallius, photographed in Hanna Forthmeiier's studio, Växjö (at that time spelt Wexiö), Sweden. (P. G. Vejde's photo collection from Skatelöv, Lund University Library.)

native home. After that, he had been an assistant librarian at the National Library of Sweden, director of the Royal Dramatic Theatre in Stockholm, Swedish-Norwegian *chargé d'affairs* at the Imperial Court of Brazil, consul-general in Rio de Janeiro, and for almost twenty years, the landlord of Sunnanvik in Torne, Skatelöv parish, Sweden. He had also written ethnological works and plays in historical settings, and founded societies for science and art as well as the first Swedish provincial museum, Småland's Museum in Växjö.

His ethnological research had been focused on Småland, especially the administrative county districts known collectively as Värend (or Wärend), inhabited by the Virde people (plural, Virdar/Wirdar, 'bold or honorable men'), described in a two-volume landmark monograph 1863–64 and 1868 which also included folkloristic information about snakes, lizards, and amphibians. During his travels in this part of the country, he had been told about a snake so huge that it could tear down trees and shape a whole riverbed. This, together with stories about how it could bite its tail and roll like a hoop—as a so called *hjulorm*, 'hoop snake'—or after shifting its shape, fly at night dropping sparks of fire—both of which he dismissed as pure myths and fantasy or misinterpretations of a natural atmospheric phenomenon. But one remarkable fact remained: he met people who swore upon their honor and immortal soul that they, or someone they knew well, had not only *seen* the dreaded creature but in some cases even *killed* it after a dramatic fight. Judging from the vivid and in his opinion credible accounts, Hyltén-Cavallius came to the conclusion that the legendary dragon of the Vikings and medieval heroic poems, although depicted in exaggerated ways, actually still existed in the Swedish forests and ought to be tracked down by zoologists. This is how he described the species:

> He usually grows to a length of about 10 feet (c. 3 m); but specimens of up to 18 or 20 feet have been observed. The body is thick as a man's leg or a man's thigh. The color on top dark, on the belly yellowish and flaming. On the neck of old specimens there is occasionally a cover of long hair or scales, which in the older folk legends invariably is compared to a horse's mane. The head is flat, round and pug-nosed, with a forked tongue, the mouth full of white shining teeth, and the big eyes protruding with a frightful sparkling gaze. The tail short and blunt, and the entire shape of the animal is heavy and ungainly.
>
> In its disposition this snake is very wild and becomes horrible through its strength and aggressiveness. When he is disturbed, he makes a loud hissing sound and begins to contract its body until it is coiled. After that he suddenly raises himself on his tail, to a height of 4 to 6 feet and moves with a wide-open mouth towards his enemy. His scaly body is so hard that even the scythe scarcely can cut him. During the fight he spits out a very venomous liquid, and if he is killed the carcass emits an extremely acrid and repulsive stench.
>
> The dragon dwells in cairns and stony settings, in wild and solitary places close to marshes and lakes. He has particularly often been seen in the rocky hills and forests to the east of lake Åsnen. He has also been seen swimming in the lakes Yen, Rottnen and Helgasjön. He then holds his head about two feet above the water and moves forward with the same winding locomotion as the common grass snake [*Natrix natrix*] (Hyltén-Cavallius, 1885a: 4–5 [from the introduction, dated 29th of October, 1883]).

Hyltén-Cavallius then stated that he, as a non-zoologist, was unable to ascertain the objective validity of the narratives that he had collected, but felt obligated to let the highest natural scientific authority of Sweden know about them and judge if they were worth some further consideration. If so, he wrote, the informants ought to be interrogated by a zoologist, and a proper reward offered for the killing and delivery of the riddle's *corpus delicti*:

Fig. 2. A wooden serpent dragon, originally used for guarding the cash-desk in a shop. It was collected by Hyltén-Cavallius who donated it to the museum he founded in Växjö. (Photo courtesy of Jörgen Ludwigsson, Kulturparken Småland AB.)

> If in this way—sooner or later—the most horrible and famous reptile of Nordic prehistoric times should be restored to our fauna, this would be a gain for, at the same time, natural history and cultural history, and would serve to encourage younger ethnologists' research on the Swedish legend (Hyltén-Cavallius, 1885a: 6 [from the introduction dated 29th of October, 1883]).

Sadly enough, this Swedish giant snake (just like Oudemans' snake-like seal) still awaits scientific discovery.

Serpent Dragons in Cultural History and Early Herpetology

During the Bronze Age, people in Southern Europe traded with people in Africa and Asia as well as Western and Northern parts of Europe, including the British Isles and Scandinavia (e.g., see Kristiansen & Larsson, 2005). Very likely, stories about pythons, spitting cobras, horned vipers, monitors, crocodiles, and other reptiles that certainly existed, and must have sounded somewhat terrifying, reached the Nordic peoples via these networks. For instance, a more than three thousand years old petroglyph in Tanum, Bohuslän, on the west-coast of Sweden, shows a man with his arms lifted above his head while standing in front of a big snake. This has been interpreted as an illustration of the Mesopotamian myth about how a serpent stole the plant of eternal youth from king Gilgamesh (Jägerbrand, 2010: 19). What the artist who made the picture called the creature in question is unknown, but it was probably not 'dragon.' That word (from Greek, *drákon*; or Latin, *draco*), with the connotations 'monstrous snake' and the ability 'to see clearly' (referring to the reptile's deadly glance), appears to have been taken up in Old Swedish at a much later date, towards the end of the Viking era, as *draki* (Bernström, 1980: 268; Hellquist, 1922: 99).

Lindorm, on the other hand, is a Germanic word, in Old Swedish *lindormber* (Hellquist 1922: 411). It is a euphemism used in order not to mention a dangerous being by its real name. *Lind* is an old word for snake and a tree (*Tilia cordata,* the linden or lime-tree in English) with the common meaning 'pliable' (as in the Swedish verb *linda*, 'to wind or wrap,' such as a rope made of linden bast), whereas *orm* (Old Swedish, *ormber*) originally referred to a worm as it still does in Danish (Hellquist, 1922: 410, 552; Bernström, 1982: 177). It can also be noted that the lindworm is not called "Lindschlange" or "lind snake" in Germany/Austria and the British Isles, where it reportedly also lived, but *Lindwurm* and *lindworm/lindwyrm*, or only *worm/wyrm*.

But such linguistic connections have been forgotten with time and were entirely unknown to the Swedish peasantry of the 19th century. Instead, according to the folk etymology, this animal was called *lindorm* because it had been born out of the trunk of a linden, and it could take children who came too close to such a hollow tree (records in the Folklore Archive, Lund). In a note to a narrative about a man who shot a big snake that had climbed a tree, Hyltén-Cavallius (1884b) wrote that it was common knowledge that the lindworm was often found in trees and especially old lindens.

Another common belief (traceable to the Near East) was that a man who buried valuables in secrecy, could be transformed into a serpent dragon after death and would then be lying upon the treasure, spitting poison towards those who approached it (Hyltén-Cavallius, 1863–64: 461; Sydow, 1917: 112–114). Serpents on rune stones and snake-shaped pieces of jewelry found in mounds of stone, as well as horrifying depictions of dragons and evil snakes in the Bible and churches, were then connected to stories about this beast. As a result, dragons made of wood and with or without wings were, for example, during Hyltén-Cavallius' school years in the 1830s, often placed over the counters in Växjö in order to guard the money (Hyltén-Cavallius, 1885a: 89) (Fig. 2).

His sources of knowledge about the living prototype was, however, not limited to oral traditions in Sweden. Throughout the 16th and 17th centuries, a number of works on natural history had included information about dragons that allegedly existed in various parts of the world. For instance, in *Serpentum et Draconum Historiae* (Aldrovandi, 1640) and *The History of Four-footed Beasts and Serpents* (Topsell, 1658), Ulisse Aldrovandi (1522–1605) and Edward Topsell (c. 1572–1625) devoted 115 and 15 pages respectively to such monstrous beings. Serpent dragons also found their way into works written by Swedes, as most notably seen in the imaginative and dramatic woodcuts that illustrated the history of Nordic peoples by the former Swedish Catholic

Fig. 3. Frode or Fridlev killing a dragon with a mane on its neck, according to a woodcut in Olaus Magnus' *Historia de Gentibus Septentrionalibus* (1555).

dean Olaus Magnus (1490–1557), printed in Rome 1555 (Olaus Magnus, 1555: 182–189) (Fig. 3). In the first Swedish book on natural history, *Physica* by astronomer Sigfrid Aron Forsius (c. 1560–1624), written around 1611 but not published until 1952, the dragon and lindworm were described as two different species, the latter being of such an enormous size that it occasionally killed and ate sheep, calves and other cattle (Forsius, 1952: 271, 275). He also wrote that snakes with "mane around the neck" could be encountered in cow-houses and on old plots of land (ibid.: 275).

During the enlightenment, naturalists were less prone to perpetuate such absurdities. Carl Linnaeus (1707–1778), for example, although being a Virde himself, did not write anything about the serpent dragons of Värend (Broberg, 2008: 30). And yet, interestingly enough, to this very day a hill in Sannaböke, not far from his childhood home in the village of Stenbrohult, is known as *Drakabacken*, or 'Dragon Hill.' He could hardly have grown up in the area without hearing the well-known story about how a man named Ingemar Larsson in the 1620s had killed a serpent dragon there and returned home with the treasure of silver that it had guarded. The cudgel said to have been used by the dragon slayer was donated in 1884 to the museum founded by Hyltén-Cavallius who also mentioned the story (Hyltén-Cavallius, 1885a: 5). In fact, at the bicentenary of Hyltén-Cavallius' birth, I met an elderly woman who claimed that she owned a spoon from this dragon's treasure.

Unlike Hyltén-Cavallius, Linnaeus did not take these types of stories seriously. Nevertheless, after having seen a seven-headed hydra and other "dragons" being displayed as highly valued natural curiosities, he found it necessary to point out in his *Systema Naturae* that all such monsters were either falsifications or figments of the imagination—otherwise humans would not have been able to inhabit the earth (Linnaeus, 1735: 10, 1766: 358; Wahlgren 2012: 8–9). On the same page he then used the name *Draco volans* ('flying dragon') for the very first lizard that he listed in the book (Linnaeus, 1735: 10). This Southeast Asian species can glide like a "real" dragon, using wing-like lateral extensions of skin, but has a modest length of 22 cm and lacks the ability of dropping sparks of fire.

The poor crofters of 19th century Värend had of course not read what Linnaeus had written in Latin (and could often not read at all). He was, therefore, not to be the last fellow of the Royal Swedish Academy of Sciences to hear rumors about dragons of his native home district or elsewhere.

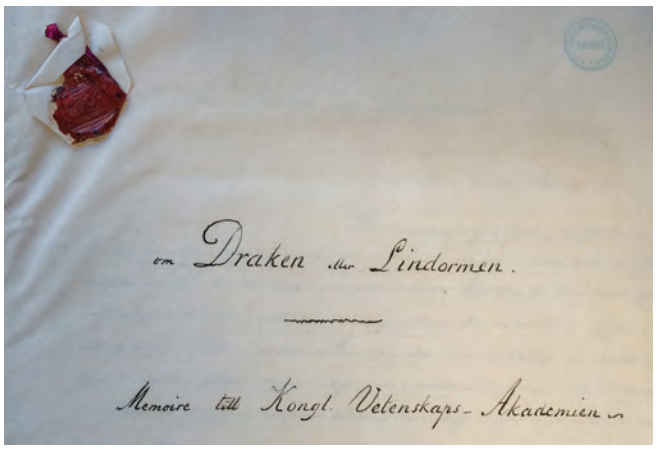

Fig. 4. The cover of the hand-written memorandum that Hyltén-Cavallius compiled in 1883–84. (Photo courtesy of Maria Asp, Center for History of Science, Royal Swedish Academy of Sciences.)

The First Edition and the Offer of a Reward

Just before Christmas in 1883, the Royal Academy of Sciences received a first hand-written report about the mysterious snake from Hyltén-Cavallius (Fig. 4). On the 11th of January, a polite letter from Fredrik (Frits) Adam Smitt (1839–1904) (Fig. 5), curator of vertebrates at the Swedish Museum of Natural History, confirmed that it had been received and read for the learned society (Smitt, 1884). This had taken place at its first meeting in 1884, on the 9th of January, and in the record it was simply stated that Smitt had reviewed the memorandum (Kongl. Vetenskaps-Akademien, 1884, 1: 1). Nothing was mentioned about how the audience had reacted.

In his letter to Hyltén-Cavallius, Smitt explained that in his opinion "fantasy had played a major part in the visions, but it would of course be foolish to doubt all probability of the existence of something new that we do not know anything about," and he added that his museum would offer "one hundred crowns for the delivery here of the first specimen of the dragon that exceeds the length of 8 feet" (Smitt, 1884). To clarify the matter, the secretary of the Academy, astronomer Daniel Georg Lindhagen (1819–1906), mentioned in a letter on the 1st of February 1884 that according to Smitt the animal in question had probably been a grass snake, "which sometimes occurs in a quite big size, although hardly of such colossal dimensions as attributed by the folk tradition," adding that the only way to find out the truth was for someone at a museum to examine a killed specimen (Lindhagen, 1884).

A month later (on the 4th of March, 1884), Hyltén-Cavallius wrote to his old friend Johan August Ahlstrand (1822–1896), librarian at the Academy, that so far he had been able to obtain sixteen sworn depositions regarding the serpent dragon from reliable persons, and he asked for advice about where to get them published (Hyltén-Cavallius, 1884c). No letter with a reply has been retrieved,

Fig. 5. Fredrik (Frits) Adam Smitt (1839–1904), who presented Hyltén-Cavallius' memorandum 'On the Dragon or Lindworm' to the Royal Swedish Academy of Sciences. (Image Collections, Lund University Library.)

but whatever it may have been Hyltén-Cavallius soon decided to print the report privately. The next month he let another friend, George Stephens (1813–1895), professor of English language and literature in Copenhagen, Denmark, and many years previously his collaborator in collecting Swedish folk songs and tales, have a look at a first draft. At the same time, perhaps encouraged by Smitt's offer, he mentioned that he had decided to offer "a reward of 100 kr. [kronor, or crowns]—that ought to be at least one thousand" (Hyltén-Cavallius, 1884d).

Stephens lent the draft to archaeologist and numismatist Christian Herbst (1818–1911), inspector at the National Museum of Denmark. According to Stephens, Herbst had said that Hyltén-Cavallius "ought to offer a reward of 1000 kr., *not* 100 kr. He has spoken to Steenstrup and others, and, if you can in this way get the *corpus delicti* the natural-history museum here will gladly give you 1000 kr. or even 2000 kr. for it, as will any other museum in Europe. All you have to do is to make a water-tight wooden case for it, put it in, and fill it up with *simple* brandy—you can then send it whither you will" (Stephens, 1884).

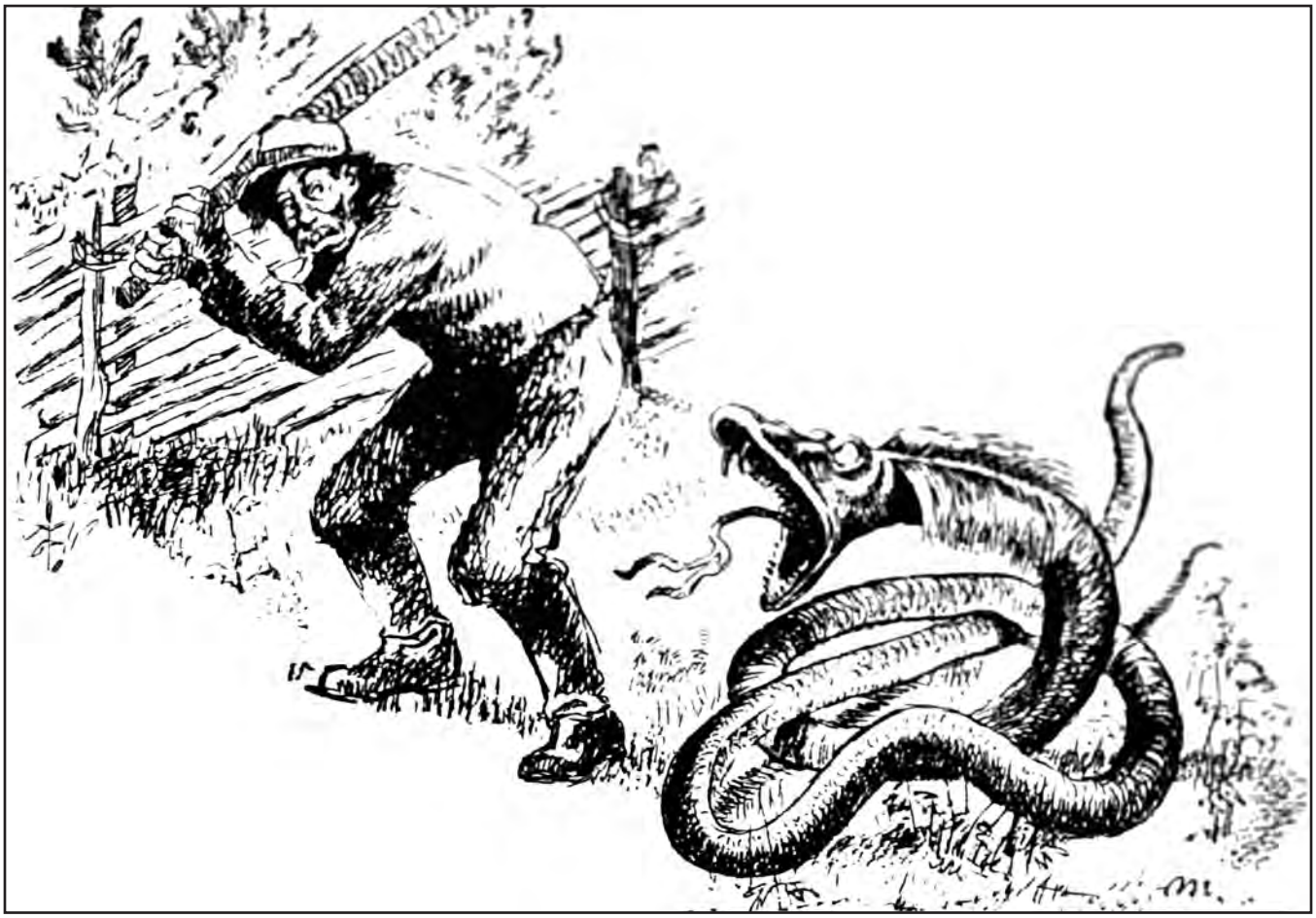

Fig. 6. The peasant and the serpent dragon. (Nils Möller, in *Levande Livet*, 1948.)

"Steenstrup" was Japetus Steenstrup (1813–1897), director of the museum mentioned by Stephens and also, a foreign fellow of the Royal Swedish Academy of Sciences since 1857 (Dahlgren, 1915: 141). Thus, three of the academy members—Smitt, Lindhagen, and Steenstrup—did directly or indirectly support the quest for the giant reptile, although this was not the same as saying that they believed in its existence. If it did exist, obtaining such an animal would mean a tremendous zoological feat—and if it did not, no expense was necessary.

In May and June 1884, Hyltén-Cavallius announced that any person who could deliver a serpent dragon to his estate, freshly killed or pickled in schnapps, would receive "from one hundred to one thousand crowns, depending on the size and other conditions of the specimen." A leaflet with this information was sent to all the churches of Värend, to be posted on their bulletin boards (Swahn, 1989a: 72). He also intended to distribute a few hundred copies of the booklet to soldiers in the region, hoping that one or more of them would be able to supply him with something to offer the eager museum directors (Hyltén-Cavallius, 1884c). An advertisement in the local newspaper let others know that a copy of the report could be purchased in Quiding's bookshop, Växjö, at one crown apiece (Smålandsposten, 1884a).

Soon thereafter, cartoonists and newspaper journalists began to ridicule the peasants who searched the dense forests with gun in hand, tempted by the promised reward—an enormous amount in those days (Fig. 6). When Hyltén-Cavallius opened the local newspaper, *Smålandsposten*, on the 26th of July 1884, he could for example read the following, written by an anonymous jester, under the sensational caption "The Lindworm is Found and Exhibited in Växjö:"

> The day before yesterday the monster was pulled in a hay-cart right through the town. His color was coal-black, had a nose pointed upwards, was 14 feet long and not less than 10 feet in circumference. Moreover, he was hard as a board and had a very solid, but yet slender build. Quite contrary to given instructions, one did not intend to put him in alcohol, but in water in a big lake not far away from here, where he will be—rowed with two pairs of oars. That it was the "real lindworm" one could clearly see, because the name was painted with big letters on the bow (Smålandsposten, 1884b).

Hyltén-Cavallius himself was far from amused by such nonsense and felt particularly mortified by the fact that the naturalists—his primary target group—proved impossible to convince about the credibility of the twenty depositions

that he, with the most serious intention, had forwarded in his memorandum.

Most annoying of the naturalists was Hjalmar Mosén (1841–1887) (Fig. 7), a former research assistant at the Swedish Museum of Natural History who was mainly known as an expert on mosses but who had also encountered a number of different snakes during an expedition to Brazil in 1873–1876. He felt impelled to publish *Ormhistorier* ('Tales about Snakes'), the first book originally written in Swedish about snakes from all over the world.

Although writing mostly about the biology of real snakes, Mosén could not refrain from mentioning the rumors about lindworms with a mane and make fun of those who had described them. It would be a good idea, he suggested, if someone in Värend could obtain a specimen for a museum or, almost as good, purchase a camera and be able to take a photograph of the reptile. The informant could then show what he had seen instead of pledging his honor. In doing so, he would also do science a great favor, because no one had "even with a magnifying glass yet been able to detect a hair on any of the 700 species of snakes of the known world" (Mosén, 1885: 55–56).

In his list of non-venomous snakes, after *Tropidonotus* [*Natrix*] *natrix*, he then specified its vernacular Swedish name as "Snok, **Lindorm**," that is, 'Grass-snake, **Lindworm**' (ibid.: 101). This was the only instance in the entire book where he used extra bold type.

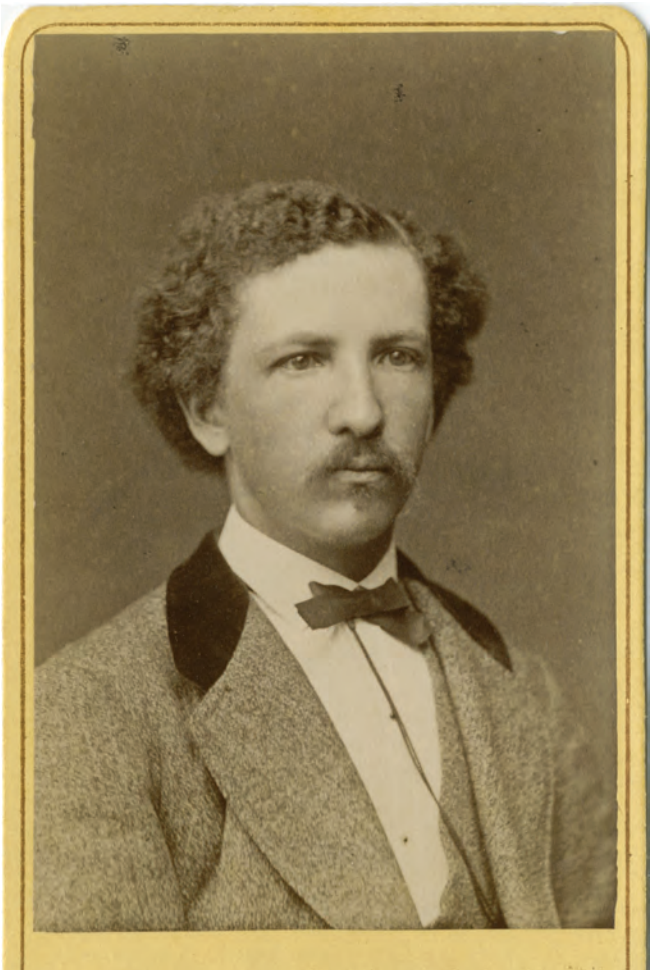

Fig. 7. Hjalmar Mosén (1841–1887), bryologist and herpetologist. (Alvin, Uppsala University Library).

The Second Edition and its Sequel

Such indolence was more than Hyltén-Cavallius could endure. He now revised his booklet and added another twenty-six eyewitness accounts, making it more than twice as long (Fig. 8 and 9). In a postscript he stated that he did not wish to tire his readers with an additional couple of dozen narratives at his disposal (Hyltén-Cavallius, 1885a: 84).

In a letter, sent together with the revised memorandum to the Academy in October 1885, Hyltén-Cavallius wrote that "the existence of the animal cannot be doubted by anyone" who read the many stories that he had been able to gather after "an extensive and laborious research" (Hyltén-Cavallius, 1885b). What he had now compiled, he explained in his postscript with direct reference to Mosén, was so unambiguous that "the learned conceit should no longer be justified to deduce that the most feared beast and most warlike symbol of the old Nordic peoples, the Swedish dragon and the Danish lindworm, was a harmless *grass snake*, while she laughs at our country's legends and mocks respected people because of their stories." (Hyltén-Cavallius, 1885a: 85).

On one point he did, however, agree with Mosén: it would (as had also been suggested by Smitt, Lindhagen, Stephens, and Steenstrup) be of a tremendous value for science to acquire a specimen of the giant reptile. August Quennerstedt (1837–1926), professor of zoology and later (1891–1895) Vice-Chancellor of Lund University, was of the same opinion. During a meeting in Lund, on the 12th of November 1887, with a society for the history of Småland, he made the remark—according to one of the participants, Axel Ramm (1858–1929)—that the dragons were probably nothing but old grass snakes. But in case the legendary creature really existed, he would be willing to pay some hundred crowns for it, because he would then be able to write an important paper (Ramm, 1887). Unfortunately, due to the lack of a type specimen, no such paper was ever written.

In the mean-time, reports had piled up on Hyltén-Cavallius' desk together with encouraging letters from a network of like-minded antiquarians and collectors of folk tales, but not from a single naturalist. "Stories about the lindworm that ought to be printed," a note by Hyltén-Cavallius (n.d.) in a collection of nearly 50 unused letters, received between November 1883 and July 1888, indicates that he might have planned to publish a third edition. According to a letter in 1886 from his friend, artist and ethnologist Nils Månsson Mandelgren (1813–1899), for instance, two huge snakes had been shot at Kolmaden to the east of Gothenburg in 1885, but none had been seen since then, although people had been searching the area eagerly in order to get the promised reward (Mandelgren,

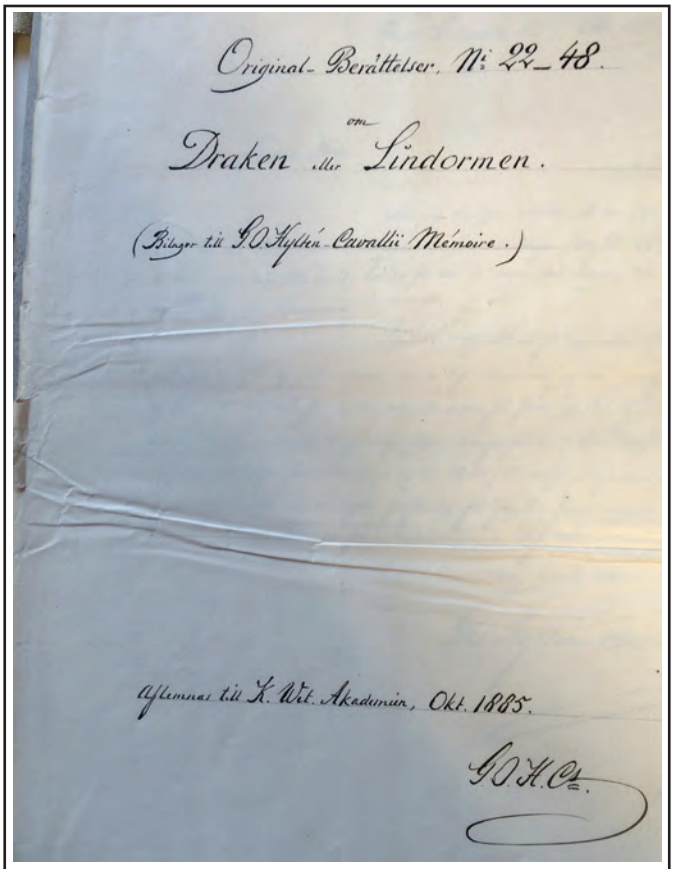

Fig. 8. The hand-written cover of the new collection of eyewitness accounts: 'Original Narratives, No. 22–48. On the Dragon or Lindworm. (Appendices to G. O. Hyltén-Cavallii Memorandum.) (To be delivered to the R. Academy of Sc., October 1885. G.O.H.C.)' (Photo courtesy of Maria Asp, Center for History of Science, Royal Swedish Academy of Sciences.)

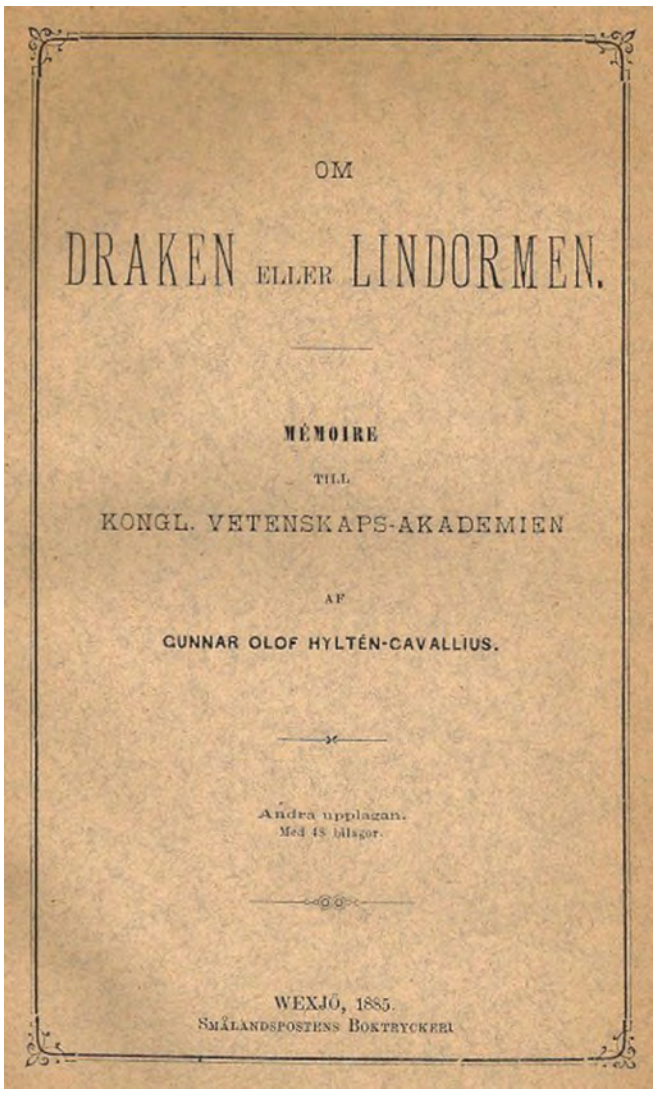

Fig. 9. On the Dragon or Lindworm. Memorandum to the Royal Swedish Academy of Sciences by Gunnar Olof Hyltén-Cavallius. Second edition. With 48 appendices. Växjö, 1885. Smålandsposten's printing works.

1886). Judging from such letters, it would only be a matter of time before the museum directors could start their bidding for a specimen, and as Pontus Erland Fahlbeck (1850–1923), a historian and political scientist, wrote, it would not be risky at all to offer an even higher reward (Fahlbeck, 1885).

But—alas!—until his death in 1889, Hyltén-Cavallius waited in vain for someone to knock on his door and deliver the corpse of a serpent dragon. According to a humorous writer of popular science almost one hundred years later, the amount offered by Hyltén-Cavallius was, however, "an important effort, because it resulted in the terrifying monster ceasing to appear" (Sjögren, 1980: 39).

On the contrary, though, it was reportedly observed by dozens of people (including my own paternal grandfather's sister) from the southernmost to the central parts of Sweden, and in a few cases even killed, during the next one hundred years (Malm, 2017). In fact, as late as 1989 folklorist Jan-Öjvind Swahn (1925–2016) stated that he occasionally received letters from people who claimed that they had almost hit such snakes while driving their car (Swahn, 1989b: 152). What kinds of animals that had actually been encountered—e.g., otters, polecats, badgers, capercaillies, sheatfish, or unusually large grass snakes—and what significance alcohol or hallucinations may have had on the "observations" is another story.

Final Comments

Hyltén-Cavallius wrote about the serpent dragon several decades before the terms 'cryptozoology' and 'cryptid' were coined. Yet, he did everything "right" from a cryptozoological point of view: He documented what his informants told him, compared it with other old or contemporary evidence, tried his best to obtain a type specimen, and forwarded the reports to the highest scientific authority for further investigation. It appears as if he had expected his project to become the crowning glory of his

life-time achievement and, as he expressed it in a letter to his friend Ahlstrand (Hyltén-Cavallius, 1884c), it was all for the honor of old Värend, the part of Sweden so close to his heart.

"Dragons," it has been argued, "have always been elusive" (Hogarth & Clery 1980: 20). That it all ended in failure may therefore not appear as a surprise. And, after all, snakes comparable in size and behavior to a hybrid between a python and spitting cobra (with a mane or crest), could not possibly survive for long in the harsh Swedish climate. It should be added, however, that not all cryptozoological endeavors have been in vain, or that eyewitness accounts that appear improbable always are without some interesting grain of truth. A good example is how the Swedish author and explorer Rolf Blomberg (1912–1996), after being told about a giant "frog" that could reach a weight of up to "2 quintales," nearly 100 kg, in 1950 discovered the Colombian giant toad (*Rhaebo* [*Bufo*] *blombergi*), which certainly does not come even close to such a size but still is among the biggest tailless amphibians of the New World (Blomberg, 1956: 92–104; Myers & Funkhouser, 1951).

Blomberg was, in a way, immortalized through the scientific name given to the big toad he found. Something corresponding *could* have happened to Hyltén-Cavallius, if he had been able to deliver a Swedish giant snake, pickled in schnapps, to the Royal Swedish Academy of Sciences.

In the end, however, he actually *did* get his dragon. The evidence is clearly visible to anyone who makes a visit to the old cemetery in the Värend parish of Skatelöv, where a magnificent, six meter tall memorial stone was erected over his grave on the 5th of July 1894, five years after his death (Fig. 10). The money, contributed by a number of sponsors in order to cut, transport, decorate, and erect it (the latter took eight men seven days) was about 800 crowns (Tornehed 1996). This was equal to the reward offered by Hyltén-Cavallius for the *corpus delicti*. The motif on the stone, reminiscent of depictions by the Vikings and even Babylonians, is as fitting as can be: a serpent dragon, biting itself in its tail (Fig. 11).

Fig. 10. Hyltén-Cavallius' memorial stone on a picture post-card produced by Joh. Johanson in Växjö and dated 1903. (P. G. Vejde's photo collection from Skatelöv, Lund University Library.)

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References

(All translations of titles and quotations from Swedish have been made by the author.)

Aldrovandi, U. 1640. *Serpentum et Draconum Historiae*. Clemente Ferroni, Bologna. x, 458 p.

Bernström, J. 1980. Drake. Pp. 267–270 *in: Kulturhistoriskt lexikon för nordisk medeltid*, 2nd ed., Vol. 3. Rosenkilde og Bagger, Copenhagen.

Bernström, J. 1982. Slanger. Pp. 175–194 *in: Kulturhistoriskt lexikon för nordisk medeltid*, 2nd ed., Vol. 16. Rosenkilde og Bagger, Copenhagen.

Blomberg, R. 1956. *Såna djur finns*, 2nd ed. Tidens Bokklubb, Stockholm. 198 p.

Broberg, G. 2008. The Dragonslayer. *Tijdschrift voor Skandinavistiek* 29(1 & 2):30–43.

Dahlgren, E. W. 1915. *Kungl. Svenska Vetenskapsakademien. Personförteckningar 1739–1915*. Almqvist & Wiksell, Stockholm. 295 p.

Eyndhoven, G. L. van. 1944. In memoriam Dr. A. C. Oudemans, 12 Nov. 1858—14 Jan. 1943. *Tijdschrift voor Entomologie* 86:1–56.

Fahlbeck, P. E. 1885. Letter to G. O. Hyltén-Cavallius, 17 October 1885. Gunnar Olof Hyltén-Cavallius' collection (L26:1a), National Library of Sweden, Stockholm. 2 p.

Fig. 11. The dragon or lindworm that bites itself in its tail was designed by Johan August Malmström (1829–1901), an artist who often chose subjects from Nordic mythology. (Photo courtesy of Christer Lindberg, Lund University.)

Folklore Archive, Lund University: Records on dragons/lindworms. M 472: 53; M 474: 7; M 8018: 8; M 8550:5.

Forsius, S. A. 1952. Physica. (Written c. 1611.) *Uppsala universitets årsskrift* 1952(10):1–376.

Hellquist, E. 1922. *Svensk etymologisk ordbok*. C. W. K. Gleerups Förlag, Lund. lxxiii, 1284 p.

Hogarth, P. & Clery, V. 1980. *Dragons*. Penguin Books, Harmondsworth. 208 p.

Hyltén-Cavallius, G. O., n. d. Om Lindormen. Gunnar Olof Hyltén-Cavallius' collection (L26:9a), National Library of Sweden, Stockholm. C. 160 p.

Hyltén-Cavallius, G. O. 1863–64 & 1868. *Wärend och Wirdarne*. 2 vols. P. A. Norstedt & Söners Förlag, Stockholm. (Facsimile edition 1972 by C. W. K. Gleerups Förlag, Lund.) 503, xiii p.; 466, liv p.

Hyltén-Cavallius, G. O. 1884a. *Om Draken eller Lindormen*. Smålandspostens boktryckeri, Växjö. 42 p.

Hyltén-Cavallius, G. O. 1884b. Note to a letter from Sara Andersdotter (June 1884), in: Om Lindormen. Gunnar Olof Hyltén-Cavallius' collection (L26:9a), National Library of Sweden, Stockholm. 1 p.

Hyltén-Cavallius, G. O. 1884c. Letter to J. A. Ahlstrand, 4 March 1884. Correspondence of the library, main series (vol. E1:3), Royal Swedish Academy of Sciences, Stockholm. 1 p.

Hyltén-Cavallius, G. O. 1884d. Letter to G. Stephens, April 1884. George Stephens' collection of letters (Acc 2012/24:6), National Library of Sweden, Stockholm. 1 p.

Hyltén-Cavallius, G. O. 1885a. *Om Draken eller Lindormen*. 2nd ed. Smålandspostens boktryckeri, Växjö. 91 p.

Hyltén-Cavallius, G. O. 1885b. Letter to J. A. Ahlstrand, October 1885. Ms Hyltén-Cavallius, G. O.; Center for History of Science, Royal Swedish Academy of Sciences. 1 p.

Hyltén-Cavallius, G. O. 1929. *Ur mitt framfarna lif*. P. A. Norstedt & Söners Förlag, Stockholm. 307 p.

Hyltén-Cavallius, G. O. & Malm, T. 2017. *Drakormens gåta*. Kronobergs läns Hembygdsförbund, Växjö. 199 p.

Jägerbrand, M. 2010. *Tanums hällristningar – guidebok till världsarvets sevärdheter.* Virvelvind Förlag, Lysekil. 38 p.

Johansen, B. 1997. *Ormalur. Aspekter av tillvaro och landskap*. Ph.D. dissertation. Department of Archaeology, Uppsala University. 300 p.

Kongl. Vetenskaps-Akademien. 1884. Onsdagen den 9 januari. *Öfversigt af Kongl. Vetenskaps-Akademiens förhandlingar* 41(1):1–2.

Kristiansen, K. & Larsson, T. B. 2005. *The Rise of Bronze Age Society.* Cambridge University Press, Cambridge. xiv, 449 p.

Lindhagen, D. G. 1884. Letter to Gunnar Olof Hyltén-Cavallius, 1 February 1884. Gunnar Olof Hyltén-Cavallius' collection (L26:9a), National Library of Sweden, Stockholm. 3 p.

Linnaeus, C. 1735. *Systema naturae, sive regna tria naturae, systematice proposita per classes, ordines, genera & species*. Theodore Haak, Leiden. 13 p.

Linnaeus, C. 1766. *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis.* 12th ed. Vol. 1. Lars Salvius, Stockholm. 532 p.

Malm, T. 2017. På spaning efter drakormen. Pp. 102–162 *in:* G. O. Hyltén-Cavallius & T. Malm, *Drakormens gåta*. Kronobergs läns Hembygdsförbund, Växjö.

Mandelgren, N. M. 1886. Letter to G. O. Hyltén-Cavallius, 6 February 1886. Gunnar Olof Hyltén-Cavallius' collection (L26:9a), National Library of Sweden, Stockholm. 3 p.

Meuger, M. 1996. The Lindorms of Småland. *Arv. Nordic Yearbook of Folklore* 52:87–89.

Mosén, H. 1885. *Ormhistorier*. Fr. Berling, Lund. 103 p.

Myers, G. S. & Funkhouser, J. W. 1951. A New Giant Toad from Southwestern Colombia. *Zoologica* 36:279–282.

Olaus Magnus. 1555. *Historia de Gentibus Septentrionalibus*. The author, Rome. lxxxiv, 815 p.

Oudemans, A. C. 1892. *The Great Sea-Serpent*. E. J. Brill, Leiden. xiv, 592 p.

Oudemans, A. C. & Stuxberg, A. 1896. *Den stora hafsormen.* Wettergren & Kerber, Gothenburg. viii, 564 p.

Ramm, A. 1887. Letter to G. O. Hyltén-Cavallius, 12 November 1887. Gunnar Olof Hyltén-Cavallius' collection (L26:9a), National Library of Sweden, Stockholm. 7 p.

Rossi, L. 2015. A Review of Cryptozoology. Towards a Scientific Approach to the Study of "Hidden Animals." Pp. 573–588. *In:* F. Angelici (ed.), *Problematic Wildlife*. Springer, Cham.

Sjögren, B. 1980. *Berömda vidunder*. Bokförlaget Settern, Ystad. 215 p.

Smålandsposten 1884a. Advertisements. *Smålandsposten* 1884(66, 7 June):1.

Smålandsposten 1884b. Lindormen är funnen och förevisad i Wexiö. *Smålandsposten* 1884:(86, 26 July):2.

Smitt, F. A. 1884. Letter to G. O. Hyltén-Cavallius, 11 January 1884. Gunnar Olof Hyltén-Cavallius' collection (L26:9a), National Library of Sweden, Stockholm. 2 p.

Stephens, G. 1884. Letter (in English) to G. O. Hyltén-Cavallius, 17 May 1884. Gunnar Olof Hyltén-Cavallius' collection (L26:9a), National Library of Sweden, Stockholm. 3 p.

Swahn, J. –Ö. 1989a. En folklorist tittar på Storsjöodjuret. *Jämten* 83:68–77.

Swahn, J. –Ö. 1989b. *Ur oknyttens värld*. Bokförlaget Bra Böcker, Höganäs. 200 p.

Sydow, G. W. von. 1917. Draken som skattevaktare. *Danmarks Folkeminder* 17:103–115.

Topsell, E. 1658. *The History of Four-footed Beasts and Serpents*. E. Cotes, London. 1132 p.

Tornehed, S. 1996. Hyltén-Cavallius minnesvård kom från trollberg i Hulevik. *Kulturspridaren* 37(4):9–11.

Wahlgren, R. 2012. Carl Linnaeus and the Amphibia. *Bibliotheca Herpetologica* 9(1–2):5–38.

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International Society for the History and Bibliography of Herpetology

Bibliotheca Herpetologica

Obituary: Joseph C. Mitchell (1948–2019), Master Naturalist

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On July 2, 2019, the life of Joseph C. Mitchell (Fig. 1) was tragically cut short by a traffic accident not far from his home in northern Florida. Joe was a long-time member of the ISHBH and was serving as the Co-Editor of *Bibliotheca Herpetologica* at the time of his death, having been elected to the position only one year earlier at the annual meeting in Rochester, New York.

Joseph Calvin Mitchell was born August 16, 1948 in Bedford, Virginia and grew up in the northern suburbs of Richmond, Virginia. His interest in herpetology began early, and he spent his summers herping in the Blue Ridge Mountains. In 1966 he joined the U.S. Marine Corps, where he served as an aviation ordnance specialist until completing his active duty in 1970. Joe graduated from Virginia Commonwealth University with a Bachelor's degree in 1974, working on geographic variation in corn snakes. He then moved to Arizona State University to pursue his master's degree with Jack Fouquette on niche overlap and reproductive biology of *Cnemidophorus* [now *Aspidoscelis*] and upon completion in 1976 he began a doctoral program at the University of Tennessee under the mentorship of Sandy Echternacht. During his studies, he relocated back to Richmond and ultimately completed his Ph.D. in 1982, studying turtle communities in abandoned golf courses.

Joe's experiences in the field and knowledge of the natural history of North American amphibians and reptiles prepared him well for a career in herpetology in his home state. He taught biology and conservation courses at a number of Virginia colleges and universities, most notably the University of Richmond (1979–2006), but his main employment was as the owner/operator of his own consulting firm, Mitchell Ecological Research Service, LLC, which gave him the freedom to pursue his own research interests. Joe remained in Virginia until his 2006 marriage to fellow herpetologist Susan Walls, at which time he moved to High Springs, Florida, near Gainesville.

Joe Mitchell was an author on more than 600 publications, including many works for the general public that made him widely known in Virginia and beyond as a herpetological expert. His book contributions included *Reptiles of Virginia* (Mitchell, 1994), *Amphibians and Reptiles of Assateague and Chincoteague Islands* (Mitchell and Anderson, 1994), *Atlas of Amphibians & Reptiles in Virginia* (Mitchell and Reay, 1999), *Salamanders of the Southeast* (Mitchell and Gibbons, 2010), *Amphibians and Reptiles of the Carolinas and Virginia* (Beane et al., 2010), and he is a posthumous co-editor of *Snakes of Arizona* (Holycross and Mitchell, 2020). Joe co-edited and contributed to the third volume in the SSAR book series, Herpetological Conservation, *Urban Herpetology* (Mitchell et al., 2008) and helped to develop a forthcoming book in the series, *Strategies for Conservation Success in Herpetology* edited by Susan C. Walls and Katherine M. O'Donnell. Joe also published extensively on his home state in a number of Virginia-based natural history and herpetological journals, e.g. *Banisteria*, *Catesbeiana*, *Virginia Journal of Science*, and *Virginia Wildlife*. However, he also published on the herpetology of Nepal (several papers with George R. Zug) and prepared global reviews of reptile cannibalism (Mitchell 1986) and intraspecific oophagy (Mitchell 1993).

Joe was quiet and humble and was a champion for the conservation and appreciation of amphibians and reptiles. He was a major contributor to herpetology through his assumption of leadership positions and his mentoring of younger herpetologists. He was active in all three of the main North American-based societies, American Society of Ichthyologists and Herpetologists (ASIH), the Herpetologists' League, and the Society for the Study of Amphibians and Reptiles. He was also involved in the foundation and growth of Partners in Amphibian and Reptile Conservation, which epitomized his own interests in herpetological conservation and the partnership of government agencies, NGOs, and academic institutions. He also was actively involved in numerous projects that promoted conservation and helped to train younger herpetologists.

Joe also had a strong interest in the history of herpetology, which drew him to the ISHBH. In particular, Joe's interests were in the biography of American herpetologists, and he published 16 papers on historical subjects and another 13 obituaries (Roble, 2019). He served on the ASIH History Committee as the herpetological historian for the last 15 years of his life. He was involved in the centennial of *Copeia* and the ASIH (2013–2016) and authored or coauthored several contributions on various aspects of the history of the ASIH. He also authored several "Historical Perspectives" (biographical interviews with senior herpetologists) published in *Copeia*. Joe had a long-time interest in the great salamander biologist, Emmett Reid Dunn (1894–1956), whose contributions he viewed as seminal to

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Fig. 1. Joe Mitchell at Salleyland, South Carolina, April 5, 2019. Photo by Whit Gibbons.

modern herpetological study in Virginia (Mitchell, 2013). In 2009, Joe was involved in organizing a symposium sponsored by the Virginia Society of Natural History titled *Historical Explorations into Virginia's Natural History*, which brought together 13 speakers presenting on a broad range of historical subjects related to the natural history of his home state. Six of these, including Joe's contribution on Dunn referenced above, were published in *Banisteria*. Joe maintained a substantial library devoted primarily to American regional and state works and the natural history of the North American herpetofauna (Fig. 2).

Further details of Joe Mitchell's life are provided in Mitchell (2019), Dodd (2019), Roble (2019), and Hilton et al. (2020). The first publication also includes a bibliography. Joe will be remembered by his many friends and colleagues as a scholar, mentor, natural historian, and conservationist.

Acknowledgements

We thank Susan Walls for providing photographs. This is contribution number 3958 of the Virginia Institute of Marine Science, William & Mary.

Fig. 2. Joe Mitchell and Jake in his office. Some of Joe's library is visible in the barrister bookcases willed to him by Roger Conant. Photo by Susan C. Walls.

References

Beane, J. C., Braswell, A. L., Mitchell, J. C., Palmer, W. M. & Harrison, J. R., III. 2010. *Amphibians and Reptiles of the Carolinas and Virginia*. University of North Carolina Press, Chapel Hill, North Carolina. [10] 274 p.

Dodd, C. K., Jr. 2019. Obituary: Joseph Calvin Mitchell (1948–2019): Natural historian, turtle enthusiast, Marine, Virginian. *Herpetological Review* 50(4):889–893.

Hilton, E. J., Bauer, A. M., Buhlmann, K. A. & Dodd, C. K., Jr. 2020. Joseph C. Mitchell (1948–2019): Herpetologist and natural historian of the Old Dominion. *Copeia* 108:188–194.

Holycross, A. T. & Mitchell. J. C. (eds.). 2020. *Snakes of Arizona*. Eco Publishing, Rodeo, NM.

Mitchell, J.C. 1986. *Cannibalism in Reptiles: a Worldwide Review*. SSAR Herp Circular 15. iii, 37 p.

Mitchell, J. C. 1993. Intraspecific oophagy in reptiles. *Herpetological Review* 24:126–130.

Mitchell, J. C. 1994. *The Reptiles of Virginia*. Smithsonian Institution Press, Washington, D.C. xv, 352 p., 16 plates.

Mitchell, J. C. 2013. Emmett Reid Dun and the early history of herpetology in Virginia. *Banisteria* 41:27–39.

Mitchell, J. C. 2019. Biographical sketch and bibliography of Joseph C. Mitchell.. *Smithsonian Herpetological Information Service* 155:1–38.

Mitchell, J. C. & Anderson, J. M. 1994. *Amphibians and Reptiles of Assateague and Chincoteague Islands*. Special Publication No. 2, Virginia Museum of Natural History, Martinsville, Virginia.[6] 120 p.

Mitchell, J. C. & Gibbons, J. W. 2010. *Salamanders of the Southeast*. University of Georgia Press, Athens, Georgia. [8] 324 p.

Mitchell, J. C., Jung Brown, R. E. & Bartholomew, B. (eds.). 2008. *Urban Herpetology*. Society for the Study of Amphibians and Reptiles, Herpetological Conservation, Vol. 3. Salt Lake City, Utah. xviii, 586 p.

Roble, S. 2019. Obituary: Joseph C. Mitchell (1948–2019). *Banisteria* 52:52–73.

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Osman Hamdi's "The Tortoise Trainer" – The Tortoise and the Tulip Revisited

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Ottoman artist Osman Hamdi Bey's 1906 painting, "The Tortoise Trainer" (oil on canvas; 221.5 x 120 cm), remains, to this day, one of his most popular works of art. On December 12, 2004, the painting was auctioned to the Suna-Inan Kiraç Foundation for 5 trillion Turkish lira ($3.5 million USD) (Agence France Presse 2004), setting a record at that time as the highest price paid for a painting by a Turkish artist. The 1906 painting is presently on exhibit today in Istanbul at the Pera Museum; Osman Hamdi's second version of "The Tortoise Trainer" (1907) has been held in a private collection, but is currently on exhibit at the Sabancı Üniversitesi Sakıp Sabancı Müzesi. While the painting achieved much acclaim, it wasn't until 2006 that the painting's namesake, the Mediterranean Spur-thighed Tortoise (*Testudo graeca ibera* Pallas 1814), was identified to species (Bettelheim and Taskavak 2006).

Osman Hamdi (1842–1910) was an accomplished painter, archaeologist, and museum curator. Although his father sent him to Paris in 1857 to study law, he instead found himself a student of French Orientalist artists Jean-Léon Gérôme (1824–1904) and Gustave Boulanger (1824–1888). After leaving Paris in 1869, Osman Hamdi helped found Istanbul's Archaeological Museum at the Topkapi Palace, where he was appointed Director in 1881. A more detailed account of Osman Hamdi's career, the painting's history, and symbolism was provided by Bettelheim and Taskavak (2006).

Until recently, it was thought that Osman Hamdi was first introduced to the role the Mediterranean Spur-thighed Tortoise played in Turkish history through his post at the Topkapi Palace. When Sultan Ahmed III came to power in the Ottoman Empire in 1703, he brought with him his obsession with the tulip (*Tulipa* sp.). Although the tulip had long been a flower favored during the earlier years of the Ottoman Empire, during Ahmed's reign (1703 to 1730) "tulipomania" took hold there and throughout the world (see Dash 1999). Among the lavish, ostentatious displays of excess surrounding the celebration of the tulip during Sultan Ahmed III's gardens, which reached a climax during a two-day spring celebration known as the Tulip Festival or Tulip Fête under April's full moon, tortoises trod the flowerbeds burdened with slow burning candles, candelabras, or small oil lamps atop their shells to illuminate the Ottoman Empire's beloved tulip (Lewis 1971, Kinross 1977, Palmer 1992, Goodwin 1998, Dash 1999).

Other explanations have been offered to explain the tortoise's symbolism. As summarized previously (see Bettelheim and Taskavak 2006), museum curators at the Eczacıbaşı Virtual Museum suggest it may have been a reference to a fashionable practice in 1840's France for *flâneurs* — idlers or loungers — to take turtles for a walk in Paris' arcades (Benjamin 1968; Note 6), while Eczacıbaşı Virtual Museum Curator Hasim Nur Gürel instead sees the tortoise as a "merciless, hopeless satire," an allegory between the historic tortoises as "palace-employees" of the Topkapi Palace and Osman Hamdi's contemporary subordinates. Art history professors Semra Germaner and Zeynep İnankur see "The Tortoise Trainer" as a metaphor for the hurdles Osman Hamdi had overcome: the dervish, represented by Osman Hamdi, thoughtfully tackling with great patience the challenges he faced founding the Archaeological Museum and School of Fine Arts (the tortoises) with nothing but his art (the musical instruments) instead of force (Germaner and İnankur 2002). The continual analysis of "The Tortoise Trainer" for hidden meaning and symbolism appears to be limited only by one's imagination (i.e., Aslan 2014).

Over the years, Osman Hamdi's life and works have continued to be scrutinized, not the least of which regards the source material of "The Tortoise Trainer"— arguably the artists' seminal work today. Considering previous interpretations of Osman Hamdi's work, Ottoman Empire historian Edhem Eldem, Professor of History at Boğaziçi University, Istanbul and International Chair of Turkish and Ottoman History at the Collège de France, Paris, has suggested that this artist's work has become a victim of "over-reading" (Eldem 2012), or more specifically, that:

> …the "over-studying" to which Osman Hamdi has been subjected is largely characterized by much disregard for historical context and a clear tendency to seek meaning in the artist's paintings, almost to the exclusion of any other form of documentation. The risk, as I see it is that every point in the artist's life and activity becomes a self-fulfilling prophecy: given a basic knowledge of Osman Hamdi Bey's general artistic, intellectual, and political inclinations, a proper "reading" of one or another of his paintings will easily reveal what was intended from the very beginning (Eldem 2012).

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Fig. 1. "The Tortoise Trainer" (1906) by Turkish painter Osman Hamdi Bey. Courtesy the collection of Suna and İnan Kıraç Foundation-Pera Museum.

Eldem goes on to argue that:

> The assumption that every, or most of, Osman Hamdi Bey's paintings had some sort of message for the viewer makes us overlook the possibility that he might have been first and foremost a *genre* painter, whose main aim was to recreate plausible and aesthetically pleasant scenes, sometimes to the point of practicing collage-like variations by transferring characters or objects from one painting to another. Is it not true that before even asking the most basic questions about *what* is represented in his paintings, from details to composition, we tend to put the cart before the horse, seeking an answer to the much more complex question of *why* he painted them? (Eldem 2012).

In 2009, Eldem turned to "The Tortoise Trainer" to dispel the mystique and metaphor that had all too often come to characterize Osman Hamdi's work. Eldem based his simpler interpretation of "The Tortoise Trainer" on the discovery of an engraving, *Charmeur de tortues* (Tortoise Charmer), by L. Crépon that accompanied Aimé Humbert's article, "Le Japon," in the French travel magazine, *Le Tour du monde* (Humbert 1869). Eldem found that Osman Hamdi's father had in fact mailed to him that very same issue of *Le Tour du monde* in 1869 (Eldem 2009), suggesting Osman Hamdi had seen L. Crépon's "Tortoise Charmer" thirty-seven years before he completed "The Tortoise Trainer" in 1906.

In the article in question, Aimé Humbert writes of her visit to the Asaksa (Asakusa) fairgrounds near the *Sensō-ji* Buddhist temple,

> *Une patience imperturbable est la vertu caractéristique des bateleurs coréens.*
>
> *Il en faut, par exemple, une forte dose pour discipliner une douzaine de tortues, grandes et petites... Le charmeur de tortues n'emploie pas d'autre procédé que le chant et la cadence d'un tam-tam métallique. Ses élèves marchent à la file, exécutent des évolutions variées et finissent par monter, sans secours humain, sur une table basse, les plus grosses de ces bonnes bêtes faisant le pont aux plus petites ; puis elles se rangent d'elles-mêmes en trois ou quatre piles, comme on entasserait des plateaux d'écaillé.*
>
> [Imperturbable patience is the characteristic virtue of Korean jugglers.
>
> It takes, for example, a strong dose of this patience to discipline a dozen turtles, large and small ... The turtle charmer uses no other method than the song and the cadence of a metal tom-tom. His pupils walk in a row, perform various evolutions and end up climbing, without human help, on a low table, the

largest of these good animals making the bridge to the smallest; then they are arranged by themselves in three or four piles, as one would pile up trays of shells (1869).]

Because this was not the first time Osman Hamdi used past works of art as the primordial basis for his own paintings (see Eldem 2009 for a more in-depth analysis), Eldem instead makes an admittedly "unimaginative" case that Osman Hamdi was simply re-interpreting, adapting, or translating L. Crépon's "Tortoise Charmer" in Ottoman trappings and that there was no underlying symbolic authorial intent (Eldem 2009).

Some scholars have discovered newfound symbolism in this revelation, peeling back a new layer of the onion to compare the Ottoman Empire and Meiji Japan based on Western dominance and Eastern subservience and the fear of modernity's dawn set against tradition's twilight, a reading awash in esoteric metaphor (see Shaw 2011 and Eldem 2012 for more in depth analysis). According to Eldem's interpretation of Humbert's text, the Korean tortoise trainer is nothing more than an entertainer, "an enjoyable curiosity and an example of patience" and "one of the many snapshots… of a charming and popular Japan" (Eldem 2009). If this is the case, in accordance with Occam's razor, Osman Hamdi simply translated the Korean trainer, musical instruments, and performing tortoises in the "Tortoise Charmer" into an Ottoman dervish, Islamic instruments, and tortoises eating lettuce.

Fig. 2. The engraving *Charmeur de tortues* (Tortoise Charmer), by L. Crépon, first appeared in Aimé Humbert's article, "Le Japon," in the French travel magazine, *Le Tour du monde*. This very same issue of *Le Tour du monde* was mentioned in correspondence between Osman Hamdi and his father in 1869, suggesting Osman Hamdi had seen L. Crépon's "Tortoise Charmer" thirty-seven years before he completed "The Tortoise Trainer" in 1906.

Another point that reinforces Eldem's interpretation is that Osman Hamdi rarely named his paintings. In the case of what we know today as "The Tortoise Trainer," or "Kaplumbağa Terbiyecisi" in the artist's native Turkish, the painting was originally catalogued in 1906 under the name "L'homme aux tortues" ('The Man with Tortoises') and, elsewhere, with the same French name but with the English translation, "Tortoises". It wasn't until 1912 that it was first referred to as the "Tortoise Trainer," but even then only in Turkish (the French remained unchanged). It wasn't until 1915 that Osman Hamdi's painting was referred to in English as the "Tortoise Charmer" (Eldem 2009).

Despite the overlap in name — coincidental or no — Eldem makes the reasonable case that because Osman Hamdi's work was rarely formally named, but was instead assigned names after the fact, any symbolism or metaphor derived from his paintings' names becomes a self-fulfilling prophecy of those who name it. And while some art historians have used Eldem's findings to further advance a symbolic narrative where Osman Hamdi was mimicking Humbert's "multilayered critique [of] Japanese society and modernity," Eldem maintains that Osman Hamdi saw nothing more than "a traditional scene that could be easily translated into an Ottoman context" (Eldem 2009):

> There is no need, then, to seek in the image of a Korean turtle charmer a repertoire of references and meanings that would help us understand Osman Hamdi's intent behind the Man with Tortoises. It seems to me that a basic reading of Osman Hamdi's own writings, including his correspondence, already provides sufficient meaning to substantially reduce the need for a quest for possible metaphors and influences (Eldem 2009).

Despite Eldem's unimaginative interpretation, the importance of Osman Hamdi's "The Tortoise Trainer"

has persisted today, none the worse for wear. The imagery of the dervish standing watch over the attentive tortoises like a shepherd tending his flock continues to capture the public's imagination and provoke interpretation, reflection, and spirited dialogue. And as long as this dialogue persists, aesthetes, critics, and historians will continue to re-interpret "The Tortoise Trainer," not unlike how Osman Hamdi breathed new life into Charmeur de tortues 37 years after it first captured his imagination. One could even argue that perhaps Osman Hamdi was himself the one charmed; after all, imitation is, as they say, the greatest form of flattery.

Acknowledgements

This work could not have been undertaken without the help of Christopher Thayer, who first brought "The Tortoise Trainer" to my attention.

References

Agence France Presse. 2004. "'Turtle Trainer' Fetches Record $3.5 Million." *The Daily Star – Lebanon*. 14 Dec.

Aslan, Şebnem. 2014. The Analysis of the Painting "Kaplumbağa Terbiyecisi: The Tortoise Trainer" (1906–1907) of Osman Hamdi in Terms of Ottoman Leadership. *IIB International Refereed Academic Social Sciences Journal*. 16(5):115–137.

Benjamin, Walter. 1968. *Illuminations* [Translated by Harry Zohn]. Harcourt, Brace & World, Inc., New York. 280 p.

Bettelheim, Matthew P. and Ertan Taskavak. 2006. The Tortoise and the Tulip – *Testudo graeca ibera* and Osman Hamdi's "The Tortoise Trainer". *Bibliotheca Herpetologica*. 6(2):11–15.

Dash, Mike. 1999. *Tulipomania: The Story of the World's Most Coveted Flower and the Extraordinary Passions It Aroused*. Three Rivers Press, New York. x, 273 p.

Eldem, Edhem. 2009. Ressamlar, Kaplumbağalar, Tarihçiler. *Toplumsal Tarih*. 185(May):20–30.

Eldem, Edhem. 2012. Making Sense of Osman Hamdi Bey and His Paintings. *Muqarnas*. 29:339–383.

Germaner, Semra and Zeynep İnankur. 2002. *Constantinople and the Orientalists*. İşbank, Istanbul. 330 p.

Goodwin, Jason. 1998. *Lords of the Horizons: A History of the Ottoman Empire*. Henry Holt and Company, New York. xvi, 352 p.

Humbert, Aimé. 1869. Le Japon. *Le Tour du monde; nouveau journal des voyages*. 19:402–416.

Kinross, Lord (John Patrick Douglas Balfour). 1977. *The Ottomas Centuries: The Rise and Fall of the Turkish Empire*. William Morrow and Company, Inc., New York. 638 p.

Lewis, Raphaela. 1971. *Everyday Life in Ottoman Turkey*. G.P. Putnam's Sons, New York. 206 p.

Palmer, Alan. 1992. *The Decline and Fall of the Ottoman Empire*. M. Evans and Company, Inc., New York. x, 306 p.

Shaw, Wendy. 2011. *Ottoman Painting. Reflections of Western Art from the Ottoman Empire to the Turkish Republic*. I.B. Tauris, London and New York. xv, 208 p.

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Constantine Rafinesque's Herpetological Observations along the Ohio River in 1818

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Introduction

Constantine Rafinesque assumes a prominent place as one of the more prolific and colorful of those naturalists who struggled to document the biodiversity of the United States in the early decades following independence. He made his first visit to the United States between April 1802 and January 1805, and during that interval began both his explorations of the botany and zoology of North America and his extensive publishing career. He left for Sicily early in 1805, and spent ten years working there before returning to the United States, where he was shipwrecked upon arrival, and spent the rest of his life as a peripatetic naturalist and author, ultimately dying in Philadelphia in September, 1840, just shy of his 57th year. The label 'eccentric' was attached to Rafinesque by John J. Audubon (1831), and it followed him through the writings of those who served in various ways as his biographers or catalogers of his published works (Call, 1895; Fitzpatrick, 1911; Pennell, 1942; Merrill, 1949; Boewe, 1982, 2001, 2003a, 2005; Wheeler, 1988; Warren, 2004).

Rafinesque was one of the most prolific authors ever to address the natural history of the United States. He wrote and published extensively, and on a breadth of topics unmatched by most scholars of his day or since. Although much of his work appeared as formal publications in mainstream journals in Europe and North America, he often aggravated and alienated his professional colleagues and overwhelmed editors with contributions of varying length and quality, and so slowly eroded his options for publishing his work in prominent journals in North America. As an example, his impatience with delays in publication led him to submit to the *American Journal of Science* a portion of a paper already sent to the Philadelphia Academy of Natural Sciences; when both appeared nearly simultaneously (Rafinesque, 1818a, 1818e), he was effectively banned from publishing again through the Philadelphia Academy (Boewe, 2005). He later sent an overwhelming number of contributions to Benjamin Silliman, publisher of the *American Journal of Science*, who in exasperation returned, unpublished, many of Rafinesque's proposed contributions (Silliman, 1841; see also Wheeler, 1988).

As a result, many of Rafinesque's writings appeared in serial publications of his own creation or in privately published pamphlets, papers, and monographs. He had somewhat limited resources throughout most of the time he was actively writing and as a consequence he limited printing runs of many of his publications to between 100 and 200 copies. Much of his writing in biological sciences is filled with nomenclatural acts, especially the proposed erection of new genera and species, but not always with sufficient description for adequate replication or even comprehension of his work. Many of the copies he distributed to scientists apparently were not retained, perhaps as a result of the disdain in which Rafinesque was held by his contemporaries and their immediate successors (Stuckey, 2003; Warren, 2004). Those who actually knew him tended to be among Rafinesque's most strident critics; they often considered his work to be of little or no value and generally adopted the smug satisfaction of simply ignoring it (Merrill, 1949; Warren, 2004). The general tendency to ignore his taxonomic proposals extended well into the 20th century and included a considerable effort to have the entire body of Rafinesque's nomenclatural acts in botany declared invalid on the grounds that their author was mentally incompetent (Boewe 2003b). A reasonably thorough (yet not exhaustive) compilation of new names he proposed for genera, species, and varieties of plants alone (Merrill, 1949) was sufficiently sobering to cause serious potential disruption to botanical taxonomy.

There are at least 1,030 works attributed to Rafinesque, and a small branch of scholarship is dedicated to ferreting out 'fugitive' publications—often titles to which Rafinesque himself referred, but which are not known to have survived (Boewe, 2001; Boewe, 2003c). The majority of his biological work, and of the commentary on his work (numbering in excess of 540 titles), was dedicated to botany (Merrill, 1949; Boewe, 1982). Much less has been written about Rafinesque's zoological efforts, and the published commentary on his herpetological work is surprisingly limited. Among the herpetological taxa for which he still is known, are several that he described from the years he spent in Kentucky (1819 through 1826) as a professor at Transylvania University. The journey that brought him

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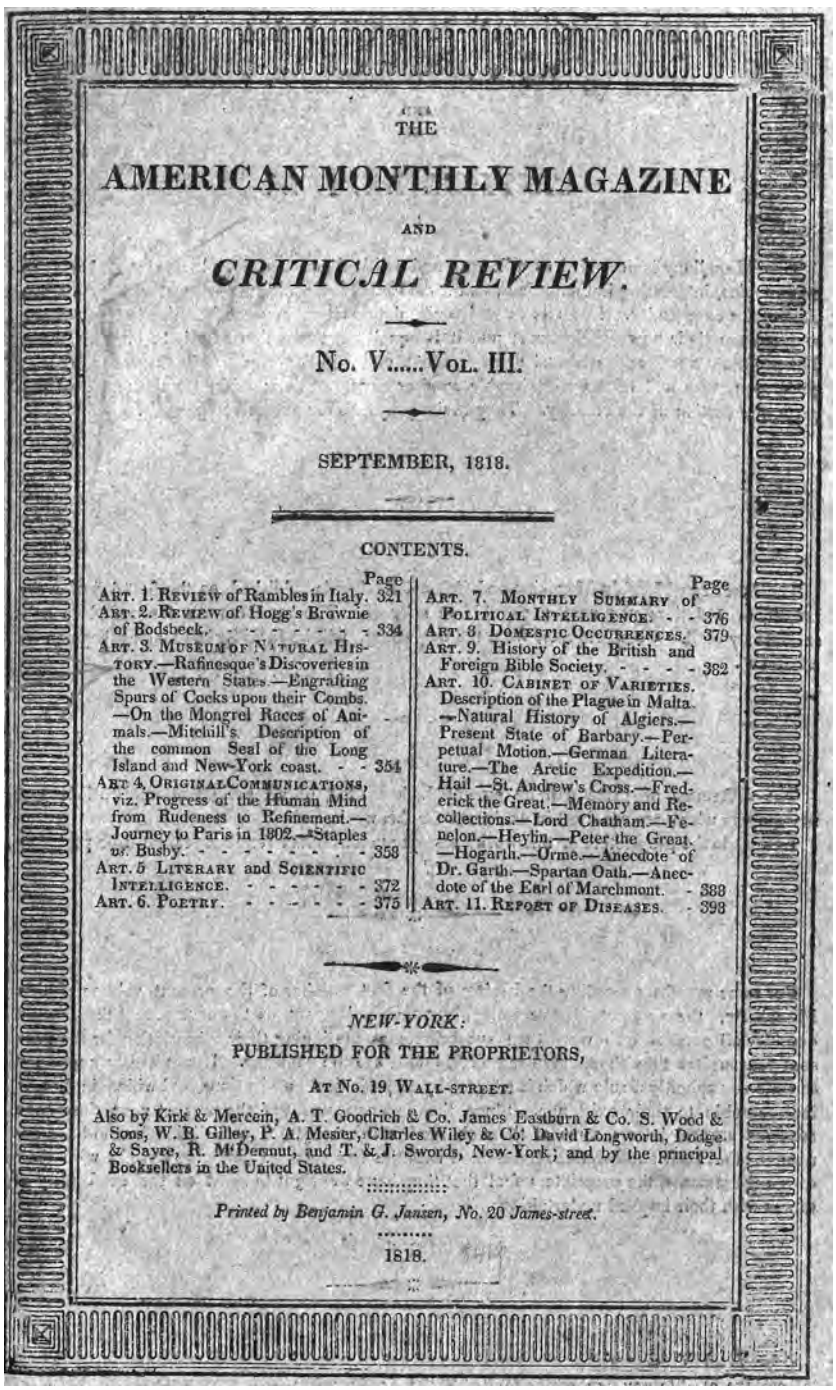

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Fig. 1. Cover of The American Monthly Magazine and Critical Review from September, 1818. This was the issue in which Rafinesque published his first report of his discoveries on the trip along the Ohio River (Rafinesque, 1818b).

to Kentucky and eventually to an offer of employment at the university, was a trek along the Ohio River. That trip yielded a wealth of zoological specimens and observations for Rafinesque and led to him proposing some now long-forgotten herpetological names.

Rafinesque Along the Ohio River, 1818

According to his autobiographical notes (Rafinesque, 1836:53–57) Rafinesque left New York in May, 1818 to journey along the length of the Ohio River. He travelled to Philadelphia and Lancaster by stagecoach, then crossed the mountains on foot to Pittsburgh, where he entered into a contract to map the Ohio River. He followed the river from Pittsburgh to Cincinnati, then travelled on foot alongside the river to North Bend, and by boat again to Louisville, Troy, Evansville, and Hendersonville (now Henderson, Kentucky). At Hendersonville he stopped to visit John James Audubon, who left us with an interesting portrait in prose of "the eccentric naturalist," widely accepted to be Rafinesque (Audubon, 1831:455–460). He then borrowed a horse and went to New Harmony on the Wabash River, crossed into Illinois, and then followed the Ohio River to its mouth. He turned back east, made his way back to Hendersonville, returned the borrowed horse, and proceeded on foot to Lexington. While there, Rafinesque visited with John D. Clifford, who convinced him to move to Lexington and take up a position at Transylvania University. The university had been established in 1799 as a derivative of Transylvania Seminary (founded 1780), the first institute of higher learning west of the Alleghanies and, under the leadership of Horace Holley who was appointed its third president in 1818, was well on its way to national prominence as an institution for the study of medicine and law. Rafinesque returned to Philadelphia before year's end to settle his affairs prior to moving to Lexington to commence his teaching position at the university as professor of botany and natural history, and later of French, Italian, and Spanish (Rafinesque, 1836).

Rafinesque documented his trip down the Ohio River, and the discoveries he made along the way, in numerous publications. The first of those appeared in a series of four short papers published in *The American Monthly Magazine and Critical Review* (Fig. 1), a short-lived serial publication of the Lyceum of Natural History of New York which was established shortly after Rafinesque's return to the United States in 1815, and of which he was a founding member. The journal was published from May, 1817 through April, 1819. Rafinesque was a regular contributor, and it was

the primary outlet for his published works in the years 1817 and 1818. The first 35 of his 44 total contributions (#s 237–256, 258–272, 274, 288–295 in the Fitzpatrick numbering system; Fitzpatrick, 1911; Boewe, 1982) appeared sequentially and were interrupted in the Fitzpatrick series only by the *Florula Ludoviciana* (Rafinesque, 1817), and the paper describing new fishes in the Journal of the Academy of Natural Sciences of Philadelphia (Rafinesque, 1818e, mentioned above). The string was broken with the inaugural issue of *The American Journal of Science*, but the final eight of his contributions appeared in the last published volume of *The American Monthly Magazine and Critical Review*.

Rafinesque established a monthly contribution section called the *Museum of Natural Sciences* (Rafinesque, 1836:53), the title of which was changed in 1818 to *Museum of Natural History* (Boewe, 2005:5). The first title to appear under the revised section heading was the first in a series of four short papers addressing discoveries in natural history and zoology that he made during his travels down the Ohio River and surrounding area. It was published in the September 1818 issue (Rafinesque, 1818b), with the others following, one each, in the remaining three issues of the year (Rafinesque, 1818c, 1818d, 1818f; in the Fitzpatrick numbering system these are listed as #270, #271, #272, and #274, respectively). Although herpetology is not the focus of any of those contributions, each of them does contain brief sections addressing herpetology.

The first report of Rafinesque's trip (Rafinesque, 1818b) was a letter addressed to the president and members of the Lyceum, dated 20 July, 1818 from Louisville. It was a short communication of only two-and-a-half pages and was centered on brief descriptions of new fishes and mollusks. In typical Rafinesque style, it also included notes on mammals, botany, fossil remains of invertebrates and plants, and a single paragraph dedicated to reptiles (Rafinesque, 1818b:354; Fig. 2).

The second report was published in October (Rafinesque, 1818c) and centered on brief descriptions of new mammals, and an ichthyological update with 20 proposed new species and one new genus. In a short paragraph dedicated to snakes Rafinesque named and briefly described five new species of snakes, *Coluber argentea*; *Coluber rubricella*, *Coluber velox*, *Coluber ichthyoplaga*, and *Crotalinus cyanurus*.

The third contribution (November, 1818; Rafinesque, 1818d) included a few brief notes on geological and mineralogical observations, notice and description of one new genus and several species of plants, a summary of zoological discoveries already made, and description of a new genus and species of bird, three new genera of fishes, a several new genera and species of invertebrates. Herpetological descriptions included those of *Sirena maculosa* (now *Necturus maculosus*), *Crotalinus catenatus* (now *Sistrurus catenatus*), *Crotalinus viridis* (now *Crotalus viridis*) and *Crotalinus cyanurus* (= *Crotalus horridus*; Boulenger, 1896; Klauber, 1956). The last of those species was already described as a new species the previous month [Rafinesque 1818c], but was herein again denoted as a 'new' species with a slightly different description. The repetitive description was missed by Boulenger (1896) who listed *cyanurus* in the synonymy of *Crotalus horridus*, but was noted by Klauber (1956:35).

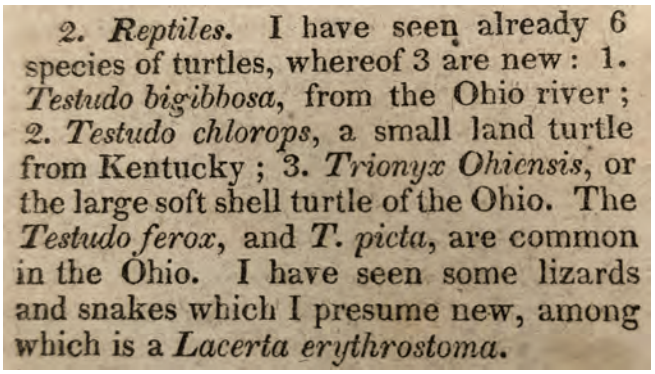
2. *Reptiles.* I have seen already 6 species of turtles, whereof 3 are new: 1. *Testudo bigibbosa*, from the Ohio river; 2. *Testudo chlorops*, a small land turtle from Kentucky; 3. *Trionyx Ohiensis*, or the large soft shell turtle of the Ohio. The *Testudo ferox*, and *T. picta*, are common in the Ohio. I have seen some lizards and snakes which I presume new, among which is a *Lacerta erythrostoma*.

Fig. 2. The brief paragraph on reptiles from Rafinesque's first report, in which he named, but did not describe, three new turtles and one new lizard from along the Ohio River.

The fourth and final notice of discoveries was a summary (list of names) of the previous three reports, with some additions. In a single short paragraph on reptiles Rafinesque noted "About 30 new species have been detected. They are, *Testudo*, 3 species. *Trionyx*, 1; *Crotalinus*, 3; *Sirena*, 3; *Coluber*, 10; *Lacerta*, 4; *Salamandra*, 2; *Ranaria*, 3; *Crocodilus*, 1, &c." (p. 107). Apart from that brief mention, the ranids and species of *Salamandra* were not discussed in the four 'discoveries' papers, nor were all of the species of *Coluber* and *Lacerta*. The inclusion of the crocodilian suggests that not all of the reported discoveries were of taxa actually found along the Ohio River and its tributaries. That suggestion is corroborated by the restriction of the type locality *of Crotalus viridis* to the area between the Heart and Cannonball rivers, within about 40 km of the Missouri River in what today is south-central North Dakota (see Holycross et al., 2008), and the fact that the modern distribution of the species reaches its eastern extent along the Missouri River near where the modern states of Iowa, Nebraska, and South Dakota meet (Powell et al., 2016).

The third contribution is certainly the best known of the four. It included descriptions of the salamander *Necturus maculosus* and two currently recognized rattlesnakes, *Crotalus viridis* and *Sistrurus catenatus* (type localities of which were clarified by Holycross et al., 2008). It is somewhat surprising that the relatively important third contribution did not draw closer attention to the other three, especially the first and second, in which additional herpetological taxa were proposed. The herpetological and ichthyological portions

Table 1. Turtle names proposed by Rafinesque (1822a) in part XII of *The Cosmonist* series in the *Kentucky Gazette*. Nomenclatural interpretations by Smith et al. (1980) are provided in the right column. *Monoclida* was listed in the synonymy of *Terrapene* by Ernst and McBreen (1991a) and *Monoclida Kentuckensis* was listed in the synonymy of *Terrapene carolina* by Ernst and McBreen (1991b). A printing error in the original newspaper left open to interpretation the name *Emyda megalonyx*; it was given as '*Emyda meg[a]lonyx*' in the reprint by Boewe (2005). The original work was suppressed by the ICZN in 1984, and all names are now nomenclaturally unavailable.

Genus	Species	Rafinesque's Common Name	Interpretation (Smith et al., 1980)
Trionyx	*nasica*	Long-nose soft-shell turtle	= *Trionyx spiniferus*
Trionyx	*pusilla*	Dwarf soft-shell turtle	= *Trionyx muticus*
Emyda	*pugnar*	Fighting Tarapen	*nomen dubium*
Emyda	*mordens*	Biting Tarapen	*nomen dubium*
Emyda	*megalonyx*	Long claw Tarapen	*nomen dubium*
Emyda	*striata*	Striped Tarapen	*nomen dubium*
Emyda	*semiradiata*	Radiating Tarapen	*nomen dubium*
Emyda	*nodosa*	Knobby Tarapen	*nomen dubium*
Emyda	*granularis*	Granulated Tarapen	*nomen dubium*
Monoclida	*Kentuckensis*	Kentucky Box Turtle	=*Terrapene carolina carolina*
Lepidemys	*bifida*	Bifid Tarapen	*nomen dubium*
Didicula	*erythrope*	Red-eye Tarapen	*nomen dubium*

of the second and third contributions (Rafinesque, 1818c, 1818d) were laid out for reprinting by the Ohio Herpetological Society, but were never published; the printer's sheets are now in the private library of Aaron Bauer.

Rafinesque's Forgotten Names from the Ohio River Trip

Turtles – The brief commentary on reptiles in the first contribution in the series (Rafinesque, 1818b) included a list of the names of three new species of turtle, *Testudo bigibbosa*, *Testudo chlorops*, and *Trionyx ohiensis*. A new lizard name, *Lacerta erythrostoma*, also was introduced (see below). No description was provided for any of these, although *Testudo bigibbosa* was reported as being "from the Ohio river," *Testudo chlorops* was reported as "a small land turtle from Kentucky," and *Trionyx ohiensis* as "the large soft shell turtle of the Ohio." *Testudo ferox* and *Testudo picta* were reported to be "common in the Ohio." Although a case can be made for *Trionyx ohiensis* having been validly, if minimally, described ("*the* large soft shell turtle…" can be construed as an attempt to differentiate the taxon from similar forms on the basis of size), the other two names clearly are *nomina nuda*.

A little less than four years later, in May of 1822, Rafinesque published a brief summary *On the Turtles of the United States* as number XII in *The Cosmonist* series that appeared in the *Kentucky Gazette* (Rafinesque, 1822a), a local newspaper that had minimal distribution outside of Kentucky (Boewe, 2005:135). That obscure work was reformatted and republished in full by Smith et al. (1980), accompanying a request to the ICZN to suppress Rafinesque's turtle paper for nomenclatural purposes. The full paper was reformatted and reprinted again by Boewe (2005), along with two other herpetological contributions from the *Cosmonist* series – number V *On two new salamanders from Kentucky*, and number XIII *On the lizards of the United States*. In his summary of turtles, Rafinesque noted his own discovery of 12 new species of turtles from the United States, provided a list of 12 binomial and common names, and indicated that a larger work on the subject was previously submitted to, but not published by, *The American Journal of Science*. He indicated it was later sent to Europe and was published there, although it remains one of Rafinesque's 'fugitive' publications that has never been located in published or manuscript form (Boewe, 2005:151).

Rafinesque is known to have relied upon memory for his many taxonomic proposals, which may explain why he named *Crotalinus cyanurus* as 'new' twice in the Ohio River series (Rafinesque, 1818c, 1818d). He is also known to have given multiple names to the same taxon at various times in his career (Merrill, 1949), and that is demonstrably the case with his names for turtles and the lizard from the Ohio River. None of the new turtle names proposed by Rafinesque (1818b) are included in the list of 12 names in number XII of the *Cosmonist* series (Rafinesque, 1822a). The names he listed in 1822 are provided in Table 1. A bridge between those two publications is available now in the form of Rafinesque's original field notebook from his trip from Philadelphia to Kentucky in 1818. That notebook is housed in the Smithsonian Archives in Washington D.C. It is available online at https://collections.si.edu/search/slideshow_embedded?inline=true&xml=http://siarchives.si.edu/sites/default/files/viewers/csc/viewer_MODSI44_007250_B01_F03.xml.

We used the notebook to help interpret the papers, but we did not plumb the totality of its herpetological content.

It contains descriptions of the turtles named by Rafinesque (1818b), accompanied by sketches made by him in the field (Fig. 3, 4). The notebook is not paginated, but skipping the inside front cover and starting on page [1], the sketch and description of *Trionyx ohiensis* is on page [47], that of *Testudo chlorops* on p. [64], and of *Testudo bigibbosa* on p. [65]. *Trionyx ohiensis* is the only name applied to the soft-shelled turtle in the notebook. The name '*chlorops'* is struck through in the notebook, and followed by '*radiata*,' indicating that Rafinesque considered both as species epithets for that turtle. Only *chlorops* appeared in print (as far as we know; Rafinesque, 1818b), although the name *semiradiata* was included in the 1822 list in *The Cosmonist* and may refer to the same animal. '*Testudo nodosa'* is given in the notebook, with (an unclosed) parenthetical '*S. bigibbosa*' following it on the same line (Fig. 5). For reasons that are not clear, Rafinesque published both names, *Testudo bigibbosa* in 1818 (Rafinesque, 1818b) and *Emyda nodosa* in 1822 (Rafinesque, 1822a).

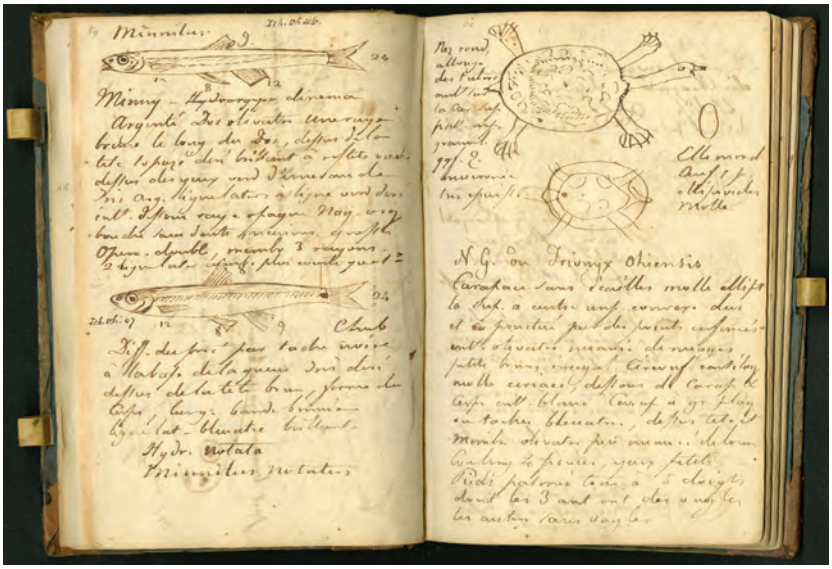

Fig. 3. The page with the field sketch and description of *Trionyx ohiensis* from Rafinesque's field notebook of the trip along the Ohio River. Smithsonian Institution Archives, Image # SIA2012-6066.

The sketches in the field notebook allow new interpretations of at least two of the turtle names published in 1818. *Testudo bigibbosa* implies 'two bumps' – the sketch in the field notebook (Fig. 5) and the name suggest a species of *Graptemys*, no fewer than three of which are in the region traversed by Rafinesque on his journey in 1818 (Powell et al., 2016). *Graptemys geographica* is recorded all along the Kentucky portion of the Ohio River; *Graptemys ouachitensis* has a spottier distribution that may have been more continuous in the early 1800s; today it includes areas along the border between Kentucky and Ohio, Indiana, and Illinois. *Graptemys pseudogeographica pseudogeographica* and *Graptemys pseudogeographica kohni* are both in western Kentucky along the river. All have posterior serrations on the carapace as shown clearly in Rafinesque's sketch. Males and juveniles of *Graptemys geographica* have low vertebral spines, *Graptemys ouachitensis* has a distinct median keel with low spines (a photograph published by Ernst and Lovich (2009:319) depicts two. *Graptemys pseudogeographica* also has conspicuous low spines; most photographs published by Ernst and Lovich (2009:326–329) have two distinct spines. *Testudo bigibbosa* and *Emyda nodosa* apparently were applied to a species of *Graptemys*, but we are not able to determine which one. Only one of the three species in the region had been described before Rafinesque passed through the area—*Graptemys geographica*, named by Le Sueur in 1817. *Graptemys pseudogeographica* was named by Gray in 1831, and *Graptemys ouachitensis* was named by Cagle in 1953.

The specific name *chlorops* implies 'green' or 'greenish-yellow.' The notebook description makes clear reference to yellow lines or rays on the scutes, and the illustration in the notebook (Fig. 6) shows distinct lines on the pleural scutes that are similar in position and orientation to the bright yellow stripes seen in *Trachemys scripta elegans*. The illustration also shows a large dark blotch on each plastral scute and on the ventral side of each marginal. Although *Testudo chlorops* was described as "a small land turtle from Kentucky," it appears to represent *Trachemys scripta elegans*.

Trionyx ohiensis (Fig. 7) obviously applies to one of the soft-shelled turtles inhabiting the Ohio River, *Apalone spinifera* or *Apalone mutica*. The only *published* description provided by Rafinesque was that it was "the large soft shell turtle of the Ohio" (Rafinesque, 1818b:354), so size was a primary consideration. The females are the larger members of both species, with maximum carapace length of *Apalone spinifera* reported as 54 cm, and of *Apalone mutica* at 35.6 cm; maximum carapace length of males are reported to be 31 cm and 26.6 cm, respectively (Ernst and Lovich, 2009; Powell et al., 2016). The description recorded by Rafinesque in his field notes is more extensive, but too general to serve to further distinguish the two (in translation, "Elliptical carapace without scales, olive color nuanced by irregular small brown clouds… underside of carapace and anterior body white with gray or bluish spots, top of head olive, 4-inch long neck, small eyes…" Based on size differences of the two species in the region, it is possible that Rafinesque's *Trionyx ohiensis* is a synonym of *Apalone spinifera*.

In the same paragraph in which he introduced the species name *ohiensis* (Rafinesque, 1818b), Rafinesque also noted that "The *Testudo ferox*, and *T. picta*, are common in the

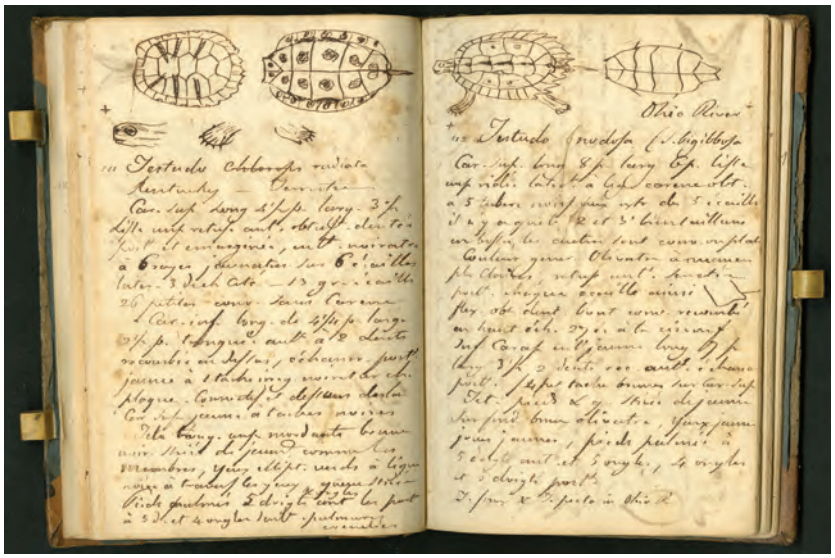

Fig. 4. The pages with the field sketches and descriptions of emydid turtles from Rafinesque's field notebook of the trip along the Ohio River. *Testudo chlorops* is on the left, *Testudo bigibbosa* on the right. Note that the name *chlorops* is crossed out, and *radiata* used in its place. Rafinesque published the name *chlorops* (Rafinesque 1818b), but as far as we know he never published the name *radiata*; the name *semiradiata* was published (Rafinesque, 1822a) and may refer to this animal. On the right, "*T. bigibbosa*" is provided in unclosed parentheses following the name *nodosa*. Both *bigibbosa* and *nodosa* were published (Rafinesque, 1818b and 1822a, respectively). Smithsonian Institution Archives, Image # SIA2012-6075.

Ohio" (2), which introduces another uncertainty. We assume that with the first of those names he was referring to *Trionyx ferox* (now *Apalone ferox*), but as early as 1816 Rafinesque recognized *Trionyx ferox* as a binomial and used it in a paper written in 1816, but publication of which was delayed for 16 years (see Rafinesque, 1832). It is not clear why two years later (1818b) he would revert to *Testudo* for the generic name. Rafinesque being who he was, there remains a possibility that he meant to refer to an entirely different animal. Neither *ohiensis* nor *ferox* were included as names in his later list of turtles of the United States (Rafinesque, 1822a; see Table 1).

A review of the common sources for North American turtles reveals that the names *Testudo bigibbosa*, *Testudo chlorops*, and *Trionyx ohiensis* are not mentioned in the chelonian literature. This includes other works by Rafinesque himself (Rafinesque, 1822a), as well as works published during Rafinesque's lifetime (M'Murtrie, 1819; Merrem, 1820; Say 1825; Bell, 1825, 1832–1836; Gray, 1830; LeConte 1830; Wagler, 1830; Duméril and Bibron 1835; Fitzinger 1835; Harlan 1835; Bonaparte 1836; Holbrook, 1836–1840, 1842; Kirtland, 1838), publications from later in the 19th century (Agassiz 1857; Gray 1844, 1856; Smith, 1882, 1883; Boulenger 1889; Garman, 1892; Hay, 1892), and 20th century and more modern works (Stejneger and Barbour, 1917, 1923, 1933, 1939, 1943; Funkhouser, 1925; Conant, 1938, 1951; Stejneger, 1944; Neill, 1951; Carr, 1952; Schmidt, 1953; Mertens and Wermuth 1955; Smith, 1961; Wermuth and Mertens 1961, 1977, 1996; Webb, 1973a, 1973b, 1973c; King and Burke 1989; Ernst and Barbour 1972; Ernst and Lovich, 2009; Turtle Taxonomy Working Group 2017). Even Sherborn (1922–1932), who found so many obscure names in his *Index Animalium*, did not record any of those names described by Rafinesque (1818b).

The only mention we found of these three names outside of their original publication appeared in the French Translation of Warden's 1819 *Statistical, Political, and Historical Account of the United States of America* (Warden, 1820). A short summary of reptiles appeared in Chapitre XVII. État de Ohio, under the section Règne Animal (p. 98): "*Reptiles*. La tortue féroce (*testudo ferox*) et la tortue peinte (*testudo picta*) sont très-communes. Le naturaliste Rafinesque en a vu six espèces, don't il assure que trois sont nouvelles; savoir: le *testudo bigibbosa*, dans la rivière d'Ohio, le *testudo chlorops* et le *trionyx ohiensis*." Curiously, the turtles were not mentioned by name in the original English language edition (Warden 1819), of which Warden (1820) was a translation. The chapter on Ohio in the English edition mentioned only that soft-shelled turtles are found in the Ohio River (p. 238), and in the section "*Fishes*," it was stated (p. 244) "The soft-shelled turtle is considered as a great delicacy."

Lizard – Although Rafinesque (1818f) claimed he detected four new lizards, only one, *Lacerta erythrostoma*, was published (Rafinesque 1818b). The name was provided with no description, nor any indication of locality beyond "western states." The name itself implies a red-mouthed lizard, and in part XIII of the *Cosmonist* series, Rafinesque (1822b) gave that common name, but placed the species in the genus *Tupinambis*. He provided no description. The only lizard in the region with a distinct red color around the mouth is *Plestiodon laticeps* (formerly *Eumeces laticeps*) which certainly occurs in the region traversed by Rafinesque in 1818 (Cooper, 1988; Powell et al., 2016).

The name was not picked up by Sherborn (1922–1932), nor was it listed by Taylor (1935) in his monograph on *Eumeces*, nor by M'Murtrie (1819), Merrem (1820), Gray (1830), Wagler (1830), Harlan (1835), Holbrook (1836–1840; 1842), Duméril and Bibron (1839), Kirtland (1838), Smith (1882, 1883), Boulenger (1887), Garman, 1892, Hay (1892), Stejneger and Barbour (1917, 1923, 1933, 1939, 1943), Funkhouser (1925), Conant (1938, 1951), Schmidt (1953), and Smith (1961). A similar species name, *erythrocephalus*, was proposed in the same year, based on a specimen from Maryland (Gilliams, 1818). Only the latter of the two was listed in the synonymy of *Eumeces laticeps* by Cooper

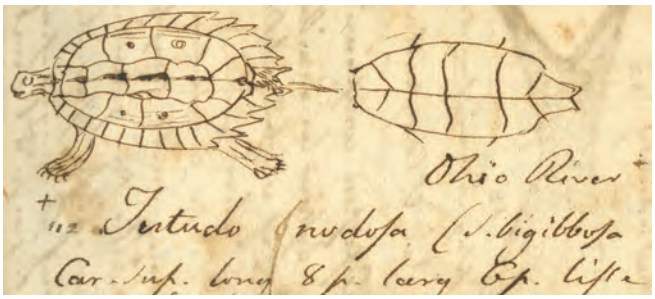

Fig. 5. Close-up image of *Testudo bigibbosa / nodosa* from Rafinesque's field notebook. From Smithsonian Institution Archives, Image # SIA2012-6075.

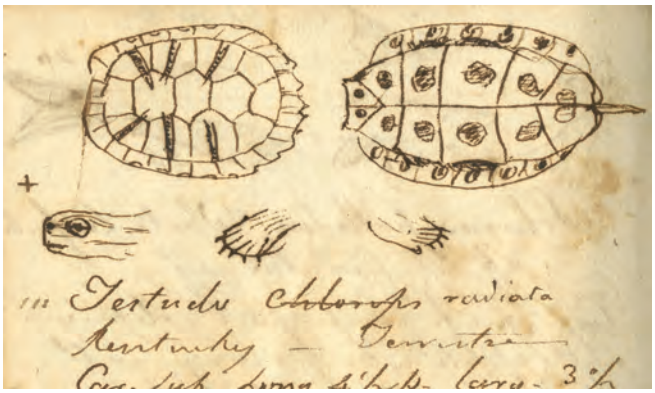

Fig. 6. Close-up image of *Testudo chlorops* from Rafinesque's field notebook. From Smithsonian Institution Archives, Image # SIA2012-6075.

(1988). The name *Lacerta erythrostoma* must be considered both a *nomen nudum* and *nomen oblitum*.

Snakes – Several of the snake names proposed by Rafinesque in the Ohio River reports were previously addressed, or at least touched upon, in the literature. Two are still valid—*Crotalinus catenatus* Rafinesque 1818d as *Sistrurus catenatus*, and *Crotalinus viridis* Rafinesque 1818d as *Crotalus viridis*. *Crotalinus cyanurus* was described as 'new' twice by Rafinesque (1818c, 1818d), and both descriptions were listed by Klauber (1956:35) in the synonymy of *Crotalus horridus*.[1]

Four additional names were listed by Rafinesque (1818c). All four were listed by Sherborn (1922–1932), but, interestingly, only two have been addressed in the literature. *Coluber argentea* ('silver snake'—common names are those given by Rafinesque) was listed by Wallach et al. (2014:801) as a *nomen dubium*, possibly in synonymy with *Rena*. We do not know to which currently recognized taxon this name might refer, but we note that no species of *Rena* is known from anywhere along the Ohio River. *Coluber ichthyoplaga* ('fishing snake') was listed by Wallach et al. (2014:476) as a *nomen dubium*, possibly in the synonymy of *Nerodia sipedon*; it was not listed as a synonym of *sipedon* by Walley et al., 2012.

Coluber rubricella ('red-breast snake') apparently was not discussed previously in the literature. It was described by Rafinesque (1818c: 446) as "black, breast red, length three or four feet. Harmless." The description suggests a specimen of the mudsnake *Farancia abacura*, a species that may reach lengths above 6.5 feet and that ranges along the lower reaches of the Ohio River between Kentucky, Illinois, and Indiana (McDaniel and Karges, 1983; Powell et al., 2016). The introductory paragraph of the paper in which Rafinesque named *Coluber rubricella* indicates that its contents include observations made along "the lower parts of the Ohio, [and] the Wabash" rivers, "and the states of Indiana, Illinois, &c." Those areas are within the northwestern range of *Farancia abacura* as documented by vouchered specimens (McDaniel and Karges, 1983), and Rafinesque may well have been the first person to apply a binomial to that snake, predating *Coluber abacurus* (Holbrook, 1836) by approximately 18 years. Another likely candidate would be a melanistic (and presumably patternless) individual of *Nerodia erythrogaster*, a species that also ranges into the lower Ohio and Wabash rivers. Individuals of that species in the region vary in coloration from gray to greenish-grey dorsum with yellow ventral coloration (formerly recognized as *Nerodia erythrogaster flavigaster*) to plain black to dark brown dorsum and orange to scarlet-red venter (formerly *Nerodia erythrogaster neglecta*; see McCranie, 1990, but the subspecies are no longer recognized as valid [Powell et al., 2016]). *Coluber rubricella* was not previously listed in the synonymy for either *Farancia abacura* (McDaniel and Karges, 1983) or *Nerodia erythrogaster* (McCranie, 1990). The brief description does not permit resolution of the currently-recognized species to which the name would apply. *Coluber rubricella* is a *nomen dubium* and *nomen oblitum*.

Coluber velox ('racer snake') was named with only a brief accompanying description: "Black, belly white, tail blue underneath, 8 feet long, slender, very swift." The description seems to indicate a racer or a rat snake; Rafinesque called it a racer, and apart from the reported length, the description is consistent with *Coluber constrictor*. The length and coloration he gave also are consistent with a large black rat snake (*Pantherophis spiloides* inhabits the region; Burbrink, 2001). Both snakes inhabit the region along the Ohio River. The maximum length for *Coluber constrictor* is under 6.5 feet; that for *Pantherophis spiloides* is just over seven feet

[1] In his synonymy Klauber (1956) erroneously reported the page-reference as p. 416 for Rafinesque 1818c, and the same error appeared in the 1972 edition of his work; the correct page is 446). Smith (1961) included *cyanurus* in the synonymy of *Crotalus horridus*, but gave the taxonomic authority as Rafinesque (1820:5); the species was [re]described in that paper, but not declared as new.

Fig. 7. Close-up image of *Trionyx ohiensis* from Rafinesque's field notebook. From Smithsonian Institution Archives, Image # SIA2012-6066.

(Powell et al., 2016). *Coluber velox* was not included as a synonym of *Coluber constrictor* (Ortenburger, 1928; Wilson, 1978), or of the eastern ratsnake complex (Burbrink, 2001). *Coluber velox* also is a *nomen dubium* and *nomen oblitum*.

In addition to the references cited above for the lizard nomenclature, we searched for and failed to find the snake names in Baird and Girard (1853), Duméril et al. (1854), and Boulenger (1896).

Discussion and Conclusion

An early overview of Rafinesque's contributions to zoology was published shortly after his death, and touched on some of his herpetological works, especially those pertaining to Europe, but the emphasis was on his work with crustaceans, mollusks, and fishes (Haldeman, 1842). A more recent overview noted the same taxonomic emphasis in Rafinesque's zoological work (Wheeler, 1988). As part of a memorial tribute held at Transylvania University on the centennial of his death a single presentation carried the promising title of *Herpetology and Rafinesque* (Clay, 1942) but was more a review of the naming of herpetological taxa inhabiting the state of Kentucky than it was a review of Rafinesque's actual contributions to the field. Nonetheless, Rafinesque proposed numerous generic and species names for amphibians and reptiles in his papers, and many are difficult to find in the original. Reprints of some of his more important papers in herpetology appeared over the decades, primarily offered in the spirit of making available the original descriptions of the relatively few taxa that he described as new and that withstood the test of time and taxonomic revision (Rafinesque 1946, 1962a, 1962b, 1963, 1978a, 1978b).

A brief review of the most significant of his herpetological contributions was provided by Adler (1989) but a detailed analysis is still lacking. As is clear from the publications discussed herein, Rafinesque occasionally peppered herpetological content, sometimes almost as an afterthought, through papers that by title alone might not spark the interest of herpetologists. Rafinesque's broad interests, manic approach to science, writing habits, and tendency to privately publish his observations and thoughts suggest that a detailed compilation of his herpetological contributions would be a daunting task. Reference to surviving correspondence and to the writings of his contemporaries can shed important light on his herpetological work, but requires patience and careful sleuthing (an excellent example is the study by Holycross et al., 2008). The challenge is compounded by the fact that Rafinesque rarely established (or retained) type specimens for his proposed taxa, and that what remained of his collections at the time of his death was widely scattered or destroyed. He was also criticized in his lifetime for his frequent failure to illustrate his works. Illustration was expensive, and during his years in Kentucky was also logistically challenging because there were at best a limited number of people who could prepare materials for illustration (for example, nobody in Kentucky could prepare wood-cuts for printing illustrations; Boewe, 2005). This is certainly lamentable because even his rough field sketches provided important assistance in our efforts to identify the turtles he named (e.g., *Testudo chlorops*). Illustrations certainly would have been an important complement to his terse descriptions, and would have drawn greater attention to his publications, if not in his lifetime then certainly so in the decades following his death when a renewed interest in his taxonomic proposals was kindled in those young taxonomists and systematists who did not personally know and interact with him, but were keenly interested in what he wrote.

It is nonetheless surprising that so many of the herpetological taxa he proposed in his early reports of discoveries along the Ohio River in 1818 remained lost and forgotten for so long. This is especially so because one of those four reports is well known as a source of three currently valid herpetological taxa. Rafinesque proposed twelve new herpetological taxa (one of them twice) in those initial reports (Table 2). Three of those are valid, and three have been identified as junior synonyms of older established names (one reliably so, one likely so, and the third almost certainly incorrectly). Of the remaining six, three are both *nomina nuda* and *nomina oblita*, and three are *nomina dubia* and *nomina oblita*, and their nomenclatural status has not been previously addressed in any way in the literature.

It seems likely that future scholarship dedicated to Rafinesque's work in herpetology will yield more insights into that eccentric and extraordinarily prolific early American naturalist.

Table 2. Herpetological species proposed in 1818 by Rafinesque in his initial reports of discoveries along the Ohio River. Nomenclatural status and possible affinity with currently recognized names are provided. 1, this study; 2, Wallach et al. (2014); 3, Boulenger (1896) and Klauber (1956).

Taxon name	Reference: page	Status	Possible Identity
Testudo bigibbosa	1818b: 354	*nomen nudum*; *nomen oblitum*	*Graptemys* sp. indet.[1]
Testudo chlorops	1818b: 354	*nomen nudum*; *nomen oblitum*	*Trachemys scripta elegans* [1]
Trionyx ohiensis	1818b: 354	*nomen dubium*; *nomen oblitum*	*Apalone spinifera*? [1]
Lacerta erythrostoma	1818b: 354	*nomen nudum*; *nomen oblitum*	*Plestiodon laticeps* [1]
Coluber argentea	1818c: 446	*nomen dubium* (proposed synonymy unlikely)	"?*Rena*" – (unlikely) [2]; affinity unknown [1]
Coluber rubricella	1818c: 446	*nomen dubium*; *nomen oblitum*	*Farancia abacura* or *Nerodia erythrogaster* [1]
Coluber velox	1818c: 446	*nomen dubium*; *nomen oblitum*	*Pantherophis spiloides* or *Coluber constrictor* [1]
Coluber ichthyoplaga	1818c: 446	probable junior synonym	*Nerodia sipedon*? [2]
Crotalinus cyanurus	1818c: 446 1818d: 41	junior synonym	*Crotalus horridus* [3]
Sirena maculosa	1818d: 41	valid as *Necturus maculosa*	*Necturus maculosa*
Crotalinus catenatus	1818d: 41	valid as *Sistrurus catenatus*	*Sistrurus catenatus*
Crotalinus viridis	1818d: 41	valid as *Crotalus viridis*	*Crotalus viridis*

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References

Adler, K. 1989. Herpetologists of the past. Pp. 5–141 *in* Adler, K. (ed.) *Contributions to the History of Herpetology*. Society for the Study of Amphibians and Reptiles, Oxford, Ohio.

Agassiz, L. 1857. *Contributions to the Natural History of the United States of America*, *first monograph, Vol. 1, part 2. North American Testudinata*. Little, Brown and Co., Boston, Massachusetts. Pp. 233–452.

Audubon, J. J. 1831. *Ornithological Biography, Or an Account of the Habits of the Birds of the United States of America; Accompanied by Descriptions of the Objects Represented in the Work Entitled The Birds of America, and Interspersed with Delineations of American Scenery and Manners*. Adam Black, Edinburgh, United Kingdom. xxiv, 512 p. [15].

Baird, S. F., and C. Girard. 1853. *Catalogue of North American Reptiles in the Museum of the Smithsonian Institution. Part I. – Serpents*. Smithsonian Institution, Washington, D.C. xvi , 172 p.

Bell, T. 1825. A monograph of the tortoises having a moveable sternum, with remarks on their arrangements and affinities. *Zoological Journal* 2:299–310.

Bell, T. 1832–1836. A Monograph on the Testudinata. London, Samuel Highley. xxiv, 82 unnumbered p., 40 plates.

Boewe, C. 1982. Fitzpatrick's Rafinesque: A Sketch of His Life with Bibliography. Revised and Enlarged. M&S Press, Weston, Massachusetts. [4] vi, [8] 327 p.

Boewe, C. 2001. Mantissa. A Supplement to Fitzpatrick's Rafinesque. M&S Press, Providence, Rhode Island. 105 p.

Boewe, C., ed. 2003a. *Profiles of Rafinesque*. The University of Tennessee Press, Knoxville, Tennessee. xli, 411 p.

Boewe, C. 2003b. The fall from grace of that "base wretch" Rafinesque. Pp. 203–216 *in* Boewe, C. (ed.) *Profiles of Rafinesque*. The University of Tennessee Press, Knoxville, Tennessee.

Boewe, C. 2003c. The fugitive publications of Rafinesque. Pp. 340–364 *in* Boewe, C. (ed.) *Profiles of Rafinesque*. The University of Tennessee Press, Knoxville, Tennessee.

Boewe, C., ed. 2005. *A C. S. Rafinesque Anthology*. McFarland & Company, Inc., Publishers, Jefferson, North Carolina. ix, 271 p.

Bonaparte, C. L. 1836. *Cheloniorum Tabula Analytica*. Rome, [no publisher given]. [2] 9 p. [An Italian-language version also was published: Bonaparte, C. 1836. Tavola analitica dei Chelonii o Testuggini. Giornale Arcadico di Scenze Lettere ed Arti 69:54–64. The typography and layout of the two are similar, and it is possible that the Latin version was issued by Presso Antonio Boulzaler, the printer who produced the Italian version].

Boulenger, G. A. 1887. *Catalogue of the Lizards in the British Museum (Natural History). Vol. 3. Lacertidæ, Gerrhosauridæ, Scincidæ, Anelytropidæ, Dibamidæ, Chamæleontidæ*. Trustees of the British Museum (Natural History), London. xii, 575 p., 40 plates.

Boulenger, G. A. 1889. *Catalogue of the Chelonians, Rhyncho-cephalians, and Crocodiles in the British Museum (Natural History)*. Trustees of the British Museum (Natural History), London, United Kingdom. x, 311 p., 6 plates.

Boulenger, G. A. 1896. *Catalogue of the Snakes in the British Museum (Natural History). Volume III. Containing the Colubridae (Opisthoglyphæ and Proteroglyphæ), Amblycephalidæ, and Viperidæ*. Trustees of the British Museum, London, United Kingdom. xiv, 727 p., 25 plates.

Burbrink, F. T. 2001. Systematics of the eastern ratsnake complex (*Elaphe obsoleta*). *Herpetological Monographs* 15:1–53.

Cagle, F. R. 1953. Two new subspecies of *Graptemys pseudogeographica*. *Occasional Papers of the Museum of Zoology, University of Michigan* 546:1–17.

Call, R. E. 1895. *The Life and Writings of Rafinesque. Prepared for the Filson Club and Read at Its Meeting, Monday, April 2, 1894*. Filson Club Publications No. 10. J. P. Morton and Company, Louisville, Kentucky. xii, 227 p.

Carr, A. F., Jr. 1952. *Handbook of Turtles: The Turtles of the United States, Canada, and Baja California*. Comstock Publishers Associates, Cornell University Press, Ithaca, New York. xviii, 542 p.

Clay, W. M. 1942. Herpetology and Rafinesque. Pp. 84–91 *in* Brown, L. A. (ed.) Rafinesque Memorial Papers October 31, 1940. *Transylvania College Bulletin* 15(7).

Conant, R. 1938. The reptiles of Ohio. *American Midland Naturalist* 20:1–200.

Conant, R. 1951. *The Reptiles of Ohio, Second Edition (with revisionary addenda)*. University of Notre Dame Press, Notre Dame, Indiana. 284 p.

Cooper, W. E., Jr. 1988. *Eumeces laticeps* (Schneider), Broad-headed Skink. *Catalogue of American Amphibians and Reptiles* 445:445.1–445.3.

Duméril, A. M. C. and G. Bibron. 1835. *Érpetologie Générale ou Histoire Naturelle Complète des Reptiles. Tome Second. Contenant l'histoire de toutes les espèces de l'ordre des tortues ou chéloniens, et les généralités de celui des lézards ou sauriens*. Librairie Encyclopédique de Roret, Paris.[2] ii, 680 p., Plates 13–24, 2 folding tables.

Duméril, A. M. C. and G. Bibron. 1839. *Érpetologie Générale ou Histoire Naturelle Complète des Reptiles. Tome Cinqième. Contenant l'histoire de quatre-vingt-trois genres et de deux cent sept espèces des trois dernières familles de l'ordre des sauriens, savoir : les lacertiens, les chalcidiens et les scincoïdiens*. Librairie Encyclopédique de Roret, Paris. viii, 854 p., [1] Plates 37, 39, 39bis, 41bis, 49, 51–54, 56–58, 4 folding tables.

Duméril, A. M. C., G. Bibron & A. H. A. Duméril. 1854. *Erpétologie Générale ou Histoire Naturelle Complète des Reptiles. Tome septième—Première partie. Comprenant l'histoire des serpents non venimeux*. Paris. Librairie Encyclopédique de Roret. vii, [4] xvi, 780 p., 1 folding table, plates 59, 63, 70, 72, 75–82.

Ernst, C. H. and R. W. Barbour. 1972. Turtles of the United States. The University Press of Kentucky, Lexington. x, 347 p., 24 plates.

Ernst, C. H. and J. E. Lovich. 2009. *Turtles of the United States and Canada, Second Edition*. The Johns Hopkins University Press, Baltimore, Maryland. xii, 827 p.

Ernst, C. H., and J. F. McBreen. 1991a. *Terrapene* Merrem. Box Turtles. *Catalogue of American Amphibians and Reptiles* 511:511.1–511.6.

Ernst, C. H., and J. F. McBreen. 1991b. *Terrapene carolina* (Linnaeus). Eastern Box Turtle. *Catalogue of American Amphibians and Reptiles* 512:512.1–512.13.

Evenhuis, N. L. 2019. Edward Griffith's "Animal Kingdom" (1824–1835): revised dates of publication and analysis of volumes, with special reference to the Mammalia and Aves based on wrapper contents. Sherbornia 5:167–202.

Fitzinger, L. J. 1835. Entwurf einer systematischen Anordnung der Schildkröten nach den Grundsätzen der natürlichen Methode. *Annalen des Wiener Museums der Naturgeschichte* 1:103–128. [The title page has a printed date of 1936, but Fitzinger's contribution was published in 1835; see editor's note in the 1997 reprint: Neue Classification der Reptilien / Entwurf einer systematischen Anordnung der Schildkröten. Society for the Study of Amphibians and Reptiles, [no location]].

Fitzpatrick, T. J. 1911. *Rafinesque. A Sketch of His Life with Bibliography*. The Historical Department of Iowa, Des Moines, Iowa. 241 p.

Funkhouser, W. D. 1925. *Wild Life in Kentucky. The Reptiles, Birds and Mammals of the Commonwealth, with a Discussion of their Appearance, Habits and Economic Importance*. The Kentucky Geological Survey, Frankfurt, Kentucky. [2] Frontispiece, [12] 385 p.

Garman, H. 1892. A synopsis of the reptiles and amphibians of Illinois. *Bulletin of the Illinois State Laboratory of Natural History* 3:215–388, [1] Plates 9–15, [erratum sheet].

Gilliams, J. 1818. Description of two new species of Linnæan Lacerta. *Journal of the Academy of Natural Sciences of Philadelphia* 1:460–462, Plate 18.

Gray, J. E. 1830. A Synopsis of the Species of the Class Reptilia. Pp. 1–110 In: Griffith, E. & Pidgeon, E. (Eds.), *The Animal Kingdom Arranged in Conformity with its Organization, by the Baron Cuvier. Vol. 9: The Class Reptilia Arranged by the Baron Cuvier, with Specific Descriptions*. Whittaker, Treacher, and Co., London. [For a discussion of the dating of this work see Evenhuis, 2019].

Gray, J. E. 1831. *Synopsis Reptilium or short descriptions of the species of reptiles. Part I: Cataphracta, tortoises, crocodiles, and enaliosaurians*. Treuttel, Wurz & Co., London, United Kingdom. vii, 78, [2] p., 11 plates.

Gray, J. E. 1844. *Catalogue of the Tortoises, Crocodiles, and Amphisbaenians in the Collection of the British Museum*. Trustees of the British Museum, London. viii, 80 p.

Gray, J. E. 1856 ("1855"). *Catalogue of the Shield Reptiles in the Collection of the British Museum. Part 1. Testudinata (Tortoises)*. Taylor and Francis, London, United Kingdom. 79 p., 50 plates. [For a discussion of the dating of this work see Webb, 1995].

Haldeman, S. S. 1842. Notice of the zoological writings of the late C. S. Rafinesque. *The American Journal of Science and Arts* 42:280–291.

Harlan, R. 1835. Genera of North American Reptilia, and a synopsis of the species. Pp. 84–163 *in* Harlan, R. *Medical and Physical Researches: or Original Memoirs in Medicine, Surgery, Physiology, Geology, Zoology, and Comparative Anatomy*. Lydia R. Bailey, Philadelphia.

Hay, O. P. 1892. The Batrachians and Reptiles of the State of Indiana. *Indiana Department of Geology and Natural Resources, Seventeenth Annual Report*. [1] pp. 410–602, [4] Plates 1–3. [A separately paginated version with some differences of the text was published by the State of Indiana, Indianpolis, Indiana, 204 pp.; that version is posted on the Biodiversity Heritage Library].

Holbrook, J. E. 1836. *North American Herpetology; or, a Description of the Reptiles Inhabiting the United States*. J. Dobson, Philadelphia, Pennsylvania. vii, [2] 9–120 p., 23 plates.

Holbrook, J. E. 1836–1840. *North American Herpetology; or, a Description of the Reptiles Inhabiting the United States*. Volume I (1836): vii, 9–120 p, 23 plates; Volume II (1838): iv, 5–125, [1] p., 30, 2 plates; Volume III (1838): viii, 9–122 p., 30

plates; Volume IV (1840): viii, 9–126 p., 28 plates. J. Dobson, Philadelphia, Pennsylvania.

Holbrook, J. E. 1842. *North American Herpetology; or, a Description of the Reptiles Inhabiting the United States. Second Edition*. Volume I: xv, 17–152 p., 24 plates; Volume II: vi, 9–142, [1] p., 20 plates; Volume III:[2], ii, 3–128 p., 30 plates; Volume IV: vi, 7–138 p., 35 plates. Volume V: vi, 5–118, [1] p., 38 plates. J. Dobson, Philadelphia, Pennsylvania

Holycross, A. T., T. G. Anton, M. E. Douglas, and D. R. Frost. 2008. The type localities of *Sistrurus cate*natus and *Crotalus viridis* (Serpentes: Viperidae), with the unraveling of a most unfortunate tangle of names. *Copeia* 2008:421–424.

ICZN (International Commission on Zoological Nomenclature). 1984. Opinion 1280. Rafinesque, C. S., 1822 'On the turtles of the United States': Suppressed. *Bulletin of Zoological Nomenclature* 41(4):221–222.

King, F. W., and R. L. Burke, eds. 1989. *Crocodilian, Tuatara, and Turtle Species of the World. A Taxonomic and Geographic Reference*. Association of Systematic Collections, Washington, D.C. xxii + 216 pp.

Kirtland, J. P. 1838. Report on the zoology of Ohio [comprising a transmittal letter, pp. 157–158 and "A catalogue of the Mammalia, birds, reptiles, fishes, Testacea, and Crustacea in Ohio", remaining pages]. Pp. 157–200 *in* Mather, W.W. Second Annual Report on the Geological Survey of the State of Ohio. Columbus, Ohio. [The herpetological sections are on pp. 167–168 and 188–190]. [Also issued as part of a separate edition of the Mather report, with the same pagination but page numbers displayed differently; possibly the official state government version – "Doc. No. 22" is printed at the top center of every page]. [A partial reprint by The Ohio Herpetological Society in 1961 was unnumbered [7 pp.], and included only a portion of the title page (from p. 157 of the original report), a page detailing the citation information, and the reptile pages cited above; it incorrectly cited pages 159–200 as the pagination of the original report].

Klauber, L. M. 1956. *Rattlesnakes, Their Habits, Life Histories, and Influence on Mankind. Volume I*. University of California Press, Berkeley and Los Angeles. xxix, 708 p., 3 folding plates.

Klauber, L. M. 1972. *The Rattlesnakes. Their Habits, Life Histories, and Influence on Mankind. In Two Volumes. Second Edition*. University of California Press, Berkeley, California. Frontispiece, xxx, pp. 1–740; Frontispiece, xvii, pp. 741–1533.

LeConte, J. 1830. Description of the species of North American tortoises. *Annals of the Lyceum of Natural History of New York* 3:91–131.

Le Sueur, C. A. 1817. An account of an American species of tortoise, not noticed in the systems. *Journal of the Academy of Natural Sciences of Philadelphia* 1:86–88, Plate 5.

McCranie, J. R. 1990. *Nerodia erythrogaster* (Forster). Plainbelly Water Snake. *Catalogue of American Amphibians and Reptiles* 500:500.1–500.8.

McDaniel, V. R., and J. P. Karges. 1983. *Farancia abacura* (Holbrook). Mud snake. *Catalogue of American Amphibians and Reptiles* 314:314.1–314.2.

Merrem, B. 1820. *Versuch eines Systems der Amphibien. Tentamen Systematis Amphibiorum*. Johann Chrisitan Krieger, Marburg. xv, 188 p. xv, 191 p., 1 plate.

Merrill, E. D. 1949. *Index Rafinesquianus. The Plant Names Published by C. S. Rafinesque with Reductions, and a Consideration of His Methods, Objectives, and Attainments*. The Arnold Arboretum of Harvard University, Jamaica Plain, Massachusetts. ix, 296 p.

Mertens, R., and H. Wermuth. 1955. Die rezenten Schildkröten, Krokodile und Brückenechsen. Eine kritische Liste der heute lebenden Arten und Rassen. *Zoologische Jahrbücher. Abteilung für Systematik, Okologie und Geographie der Tiere* 83(5):323–440.

M'Murtrie, H. 1819. *Sketches of Louisville and its Environs; Including, Among a Great Variety of Miscellaneous Matter, a Florula Louisvillensis; or, a Catalogue of Nearly 400 Genera and 600 Species of Plants, that Grow in the Vicinity of the Town, Exhibiting their Generic, Specific, and Vulgar English Names. To Which is Added an Appendix, Containing an Accurate Account of the Earthquakes Experienced here from the 16th December, 1811, to the 7th February, 1812, Extracted Principally from the Papers of the Late J. Brookes, Esq.* S. Penn, Louisville, Kentucky. viii, 255 p., 1 map. [This was reprinted in 1969 by G. R. Clark Press, Louisville, Kentucky, as a Sesquicentennial Edition, with a 15-page Epilogue and Index.]

Neill, W. T. 1951. The taxonomy of North American soft-shelled turtles, genus *Amyda*. *Publications of the Research Division, Ross Allen's Reptile Institute* 1(2):7–24.

Ortenburger, A. I. 1928. The whip snakes and racers, genera *Masticophis* and *Coluber*. Memoirs of the University of Michigan Museums 1. xviii, 247 pp., 36 plates, 4 folding maps.

Pennell, F. W. 1942. The life and work of Rafinesque. Pp. 10–70 *in* Rafinesque Memorial Papers October 31, 1940 (L. A. Brown, ed.). *Transylvania College Bulletin* 15(7).

Powell, R., R. Conant, and J. T. Collins. 2016. *Peterson Field Guide to Reptiles and Amphibians of Eastern and Central North America. Fourth Edition*. Houghton Mifflin Harcourt, Boston, Massachusetts. xiii, [1] 494 p.

Rafinesque, C. S. 1817. *Florula Ludoviciana; or, A Flora of the State of Louisiana. Translated, Revised, and Improved, from the French of C. C. Robin*. C. Wiley & Co., New York, New York. 165 p. [13 p. addressing various publications, published or planned, by Rafinesque].

Rafinesque, C. S. 1818a. Description of a new genus of North American fresh-water fish, *Exoglossum*. *The American Journal of Science, More Especially of Mineralogy, Geology, and the Branches of Natural History, Including also Agriculture and the Ornamental as Well as Useful Arts* 1:155–156.

Rafinesque, C. S. 1818b. Discoveries in natural history, made during a journey through the western region of the United States, by Constantine Samuel Rafinesque, Esq. addressed to Samuel L. Mitchill, President, and other members of the Lyceum of Natural History, in a letter dated at Louisville, Falls of Ohio, 20th July, 1818. *The American Monthly Magazine and Critical Review* 3(5):354–356.

Rafinesque, C. S. 1818c. Further discoveries in natural history, made during a journey through the western region of the United States. *The American Monthly Magazine and Critical Review* 3(6):445–447.

Rafinesque, C. S. 1818d. Farther account of discoveries in natural history, in the western states, by Constantine Samuel Rafinesque, Esq. communicated in a letter from that gentleman to the editor. *The American Monthly Magazine and Critical Review* 4(1):39–42.

Rafinesque, C. S. 1818e. Description of three new genera of fluviatile fish, *Pomoxis*, *Sarchirus* and *Exoglossum*. *Journal of the Academy of Natural Sciences of Philadelphia* 1(2):417–422, Plate XVII.

Rafinesque, C. S. 1818f. General account of the discoveries made in the zoology of the western states. *The American Monthly Magazine and Critical Review* 4(2):106–107.

Rafinesque, C. S. 1820. *Annals of Nature or Annual Synopsis of New Genera and Species of Animals, Plants, &c. Discovered in North America* 1:1–16. [Lexington, Kentucky].

Rafinesque, C. S. 1822a. The Cosmonist – No. XII. On the turtles of the United States. *Kentucky Gazette*, n.s. 1, 36(21):3, columns 3–4. [23 May, 1822]. [Not seen; as cited by Smith et al., 1980]. [Reprinted in 2005, pp. 150–151 *in* Boewe, C. (ed.) *A C. S. Rafinesque Anthology*, McFarland & Company, Inc., Publishers, Jefferson, North Carolina].

Rafinesque, C. S. 1822b. The Cosmonist – No. XIII. On the lizards of the United States. *Kentucky Gazette*, n.s. 1, 36(29):3. [18 July, 1822]. [Not seen; volume and pagination as cited by Ross and Ernst, 1994]. [Reprinted in 2005, pp. 151–152 *in* Boewe, C. (ed.) A C. S. Rafinesque Anthology, McFarland & Company, Inc., Publishers, Jefferson, North Carolina].

Rafinesque, C. S. 1832. Description of two new genera of soft shell turtles of North America. *Atlantic Journal, and Friend of Knowledge* 1(2):64–65.

Rafinesque, C. 1836. *A Life of Travels and Researches in North America and South Europe, or Outlines of the Life, Travels and Researches of C. S. Rafinesque, A.M. Ph. D. Professor of Historical and Natural Sciences, Member of Many Learned Societies in Europe and North America. Author of Many Works, &c. Containing His Travels in North America and the South of Europe; the Atlantic Ocean, Mediterranean, Sicily, Azores, &c. from 1802 to 1835—with Sketches of his Scientific and Historical Researches &c.* Privately Published, Philadelphia, Pennsylvania. 148 p. [This was reprinted in Sterling, K. B., ed. 1978. *Rafinesque. Autobiography and Lives*. Arno Press, New York, New York].

Rafinesque, C. S. 1946 (1832–1833). *Atlantic Journal and Friend of Knowledge, Philadelphia* 1(1–8). Reprinted in 1946 by the Arnold Arboretum, Cambridge, Massachusetts. [5] 212 p.

Rafinesque, C. S. 1962a (1820). *Annals of nature or annual synopsis of new genera and species of animals, plants, &c. discovered in North America. First Annual Number, for 1820.* Printed for the author in Lexington, Kentucky. Reprinted in December, 1962, by the Ohio Herpetological Society [no place of publication given]. Pp. 4–[6] [1]. [Only the herpetological and ichthyological sections were reprinted, with original pagination retained].

Rafinesque, C. S. 1962b (1832). *The herpetological papers of C. S. Rafinesque extracted from Atlantic Journal and Friend of Knowledge, Philadelphia*. Reprinted in December, 1962 by the Ohio Herpetological Society, [no place of publication given]. 4 pp. [Reprinted titles are Description of the *Spelerpes* or salamander of the caves of Kentucky. *Atlantic Journal and Friend of Knowledge, Philadelphia* 1(1):22; On the salamander of the hills of east Kentucky. *S. lurida*. *Atlantic Journal and Friend of Knowledge, Philadelphia* 1(2):63–64; Description of two new genera of soft shell turtles of North America. *Atlantic Journal and Friend of Knowledge, Philadelphia* 1(2):64–65; On 3 new water salamanders of Kentucky. *Atlantic Journal and Friend of Knowledge, Philadelphia* 1(3):121; New lizard from Kentucky. *Atlantic Journal and Friend of Knowledge, Philadelphia* 1(4):143–144].

Rafinesque, C. S. 1963 (1822). On two new salamanders of Kentucky. *Kentucky Gazette (Lexington, Kentucky)*, n.s. 1(9). [2] p. Reprinted in September, 1963, by the Ohio Herpetological Society.

Rafinesque, C. S. 1978a (1817). Dissertation on water snakes, sea snakes and sea serpents. *In* Adler, K. (ed.) *Early Herpetological Studies and Surveys in the eastern United States*. Arno Press, New York, New York. [Reprinted from *The American Monthly Magazine and Critical Review* 1:431–435].

Rafinesque, C. S. 1978b (1819). Natural history of the *Scytalus Cupreus*, or copper-head snake. *In* Adler, K. (ed.) *Early Herpetological Studies and Surveys in the eastern United States*. Arno Press, New York, New York. [Reprinted from *The American Journal of Science* 1:84–86. There are multiple editions of volume 1 of the American Journal of Science; the 1978 Reprint is attributed to the 1819 second edition; the first edition was published in 1818. A thorough discussion of the publication history was provided by Woodman, 2017.]

Ross, C. A., and C. H. Ernst. 1994. *Alligator mississippiensis* (Daudin). American Alligator. *Catalogue of American Amphibians and Reptiles* 600:600.1–600.14.

Say, T. 1825. On the fresh water and land tortoises of the United States. Journal of the Academy of Natural Sciences, Philadelphia 4:203–219, 412 [Addenda et Corrigenda (part)].

Schmidt, K. P. 1953. *A Check List of North American Amphibians and Reptiles, Sixth Edition*. American Society of Ichthyologists and Herpetologists, Chicago, Illinois. viii, 280 p.

Sherborn, C. D. 1922–1932. *Index Animalium sive index nominum quae ab. A.D. MDCCLVIII generibus et specibus animalium imposita sunt. Sectio Secunda [Parts 1–28]. A kalendris Ianuariis, MDCCCI usque ad finem Decembris MDCCCL*. British Museum (Natural History), London, United Kingdom. cxlvii, 7056 p. 114 p.

Silliman, B. 1841. [Editor's note]. *American Journal of Science and Arts* 40(2):237, footnote.

Smith, H. M., D. Chiszar, and R. B. Smith. 1980. Rafinesque, 1822, "On the turtles of the United States" (Reptilia, Testudines): Proposed suppression by use of the plenary powers. Z.N.(S.) 2289. *Bulletin of Zoological Nomenclature* 37(1):53–56.

Smith, P. W. 1961. The Amphibians and Reptiles of Illinois. Illinois Natural History Survey Bulletin 28(1):[6] 298 p.

Smith, W. H. 1882. Report on the reptiles and amphibians of Ohio. Pp. 629–734 *In Report of the Geological Survey of Ohio. Volume IV. Zoology and Botany. Part. I. Zoology*. Legislature of Ohio, Columbus.

Smith, W. H. 1883. Bericht über die Reptilien und Amphibien von Ohio. Pp. 691–801 *in Bericht über die Geologische Aufnahme von Ohio. IV. Band. Zoologie und Botanik. I. Theil. Zoologie*. Gesetzgebung von Ohio, Columbus. [German language edition of Smith, 1882].

Stejneger, L. 1944. Notes on the American soft-shell turtles with special reference to *Amyda agassizii*. Bulletin of the Museum of Comparative Zoölogy 94:1–75, 30 plates. and 31 unnumbered plate caption pages.

Stejneger, L. and T. Barbour. 1917. A Check List of North American Amphibians and Reptiles, Harvard University Press, Cambridge, Massachusetts. iv, 125 p.

Stejneger, L. and T. Barbour. 1923. A Check List of North American Amphibians and Reptiles, Second Edition. Harvard University Press, Cambridge, Massachusetts. x, 171 p.

Stejneger, L. and T. Barbour. 1933. A Check List of North American Amphibians and Reptiles, Third Edition. Harvard University Press, Cambridge, Massachusetts. xiv, 185 p.

Stejneger, L. and T. Barbour. 1939. A Check List of North American Amphibians and Reptiles, Fourth Edition. Harvard University Press, Cambridge, Massachusetts. x vi, 207 p.

Stejneger, L. and T. Barbour. 1943. A Check List of North American Amphibians and Reptiles, Fifth Edition. Bulletin of the Museum of Comparative Zoölogy 93:i–xix, 1–260.

Stuckey, R. L. 2003. Opinions of Rafinesque expressed by his American botanical contemporaries. Pp. 154–178 *in* Boewe, C. (ed.) *Profiles of Rafinesque*. The University of Tennessee Press, Knoxville, Tennessee.

Taylor, E. H. 1935. A taxonomic study of the cosmopolitan scincoid lizards of the genus *Eumeces* with an account of the distribution and relationships of its species. *The Kansas University Science Bulletin* 23(14):1–643.

Turtle Taxonomy Working Group (TTWG) [Rhodin, A. G. J., J. B. Iverson, R. Bour, U. Fritz, A. Georges, H. B. Shaffer, and P. P. Van Dijk]. 2017. Turtles of the world: annotated checklist and atlas of taxonomy, synonymy, distribution, and conservation status (8th Ed.). *Chelonian Research Monographs*, Number 7. 292 p.

Wagler, J. G. 1830. Natürliches System der Amphibien, mit vorangehender Classification der Säugthiere und Vögel. Ein Beitrag zur vergleichenden Zoologie. G. J. Cotta'schen Buchhandlung, München, Stuttgart und Tübingen. vi, 354 p., 1 plate.

Wallach, V., K. L. Williams, and J. Boundy. 2014. Snakes of the World. A Catalogue of Living and Extinct Species. CRC Press, Taylor & Francis Group, Boca Raton, Florida. xxvii, 1209 p. [A version of this book that is available on the internet has different pagination].

Walley, H. D., R. B. King, J. M. Ray, and T. L. Wusterbarth. 2012. *Nerodia sipedon* (Linnaeus). Northern Watersnake. *Catalogue of American Amphibians and Reptiles* 899:899.1–899.58.

Warden, D. B. 1819. *A Statistical, Political, and Historical Account of the United States of America; from the Period of Their First Colonization to the Present Day. Volume II.* Archibald Consgable and Co., Edinburgh, United Kingdom. xii, 571 p.

Warden, D. B. 1820. *Description Statistique, Historique et Politique des États-Unis de l'Amérique Septentrionale, depuis l'Époque des Premiers Établissement jusqu'a Nos Jours. Tome IV*. Chez Rey et Gravier, Libraires, Paris. xiii, 718 p.

Warren, L. 2004. *Constantine Samuel Rafinesque. A Voice in the American Wilderness.* The University Press of Kentucky, Lexington, Kentucky. xiv, 252 p., [8].

Webb, R. G. 1973a. *Trionyx ferox* (Schneider). Florida softshell turtle. *Catalogue of American Amphibians and Reptiles* 138:138.1–138.3.

Webb, R. G. 1973b. *Trionyx muticus* Lesueur. Smooth softshell turtle. *Catalogue of American Amphibians and Reptiles* 139:139.1–139.2.

Webb, R. G. 1973c. *Trionyx spiniferus* Lesueur. Spiny softshell turtle. *Catalogue of American Amphibians and Reptiles* 140:140.1–140.4.

Webb, R. G. 1995. The date of publication of Gray's Catalogue of Shield Reptiles. *Chelonian Conservation and Biology* 1:322–323.

Wermuth, H., and R. Mertens. 1961. *Schildkröten, Krokodile, Brückenechsen*. G. Fischer, Jena, Germany. xxvi, [1] 422 p.

Wermuth, H., and R. Mertens. 1977. Liste der rezenten Amphibien und Reptilien. Testudines, Crocodylia, Rhynchocephalia. *Das Tierreich* 100:xxvii, 1–174.

Wermuth, H., and R. Mertens. 1996. *Schildkröten, Krokodile, Brückenechsen. Nachdruck der Ausgabe von 1961 mit einem ergänzenden Nachtrag von Dipl. Biol. Fritz Jürgen Obst, Staatliches Museum für Tierkunde Dresden*. G. Fischer, Jena, Germany. xxvi, [1] 506 p.

Wheeler, A. 1988. An appraisal of the zoology of C. S. Rafinesque. *Bulletin of Zoological Nomenclature* 45:6–12.

Wilson, L. D. 1978. *Coluber constrictor* Linnaeus. Racer. Catalogue of American Amphibians and Reptiles 218:218.1–218.4.

Woodman, N. 2017. There are multiple editions of the first volume of Benjamin Silliman's *American Journal of Science* – and why it matters. Sherbornia 4(2):9–21.

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International Society for the History and Bibliography of Herpetology

Bibliotheca Herpetologica

In Memory of Richard Wahlgren (9 December 1946–5 October 2019) Founding Chairman of the ISHBH and Book Collector Extraordinaire

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Just over one year ago, Richard Wahlgren (Fig. 1), the Chairman and driving force behind the International Society for the History and Bibliography of Herpetology (ISHBH) for more than two decades, passed away at his home in Lund, Sweden. Richard was a much beloved figure in bibliographic circles both in Sweden and abroad. This tribute comprises three parts, 1) an initial brief recounting of Richard's life and interests and his role in the ISHBH, 2) remembrances from three of his friends, and 3) a bibliography of Richards published works. Other tributes to Richard may be found in "Till minne av Richard Wahlgren, 9 december 1946 – 5 oktober 2019" a special contribution to *Snoken*, 49(1) [2020].

Richard was born in Gävle, about 160 km north of Stockholm on the southwest coast of the Gulf of Bothnia. His great grandfather Fredrik August Wahlgren (1819–1877) had been Professor of Zoology and Rector at the University of Lund. As a boy Richard was a very keen birder, both watching and ringing birds. In his late teens he became interested in reptiles, keeping quite a few Grass Snakes (*Natrix natrix*) at his home, much to the dismay of his parents. When in high school Richard was also the manager of a rock band and toured central Sweden with them. In 1969 Richard moved to Lund where he studied economics and computer programming at Lund University. His herpetological interests continued to develop and in his student room he kept large numbers of snakes.

In 1973, after completing his studies, Richard was employed by the multinational construction firm Skanska as an accountant. One of his first assignments was to oversee the accounting of the company's hydropower station project on the Ruaha River in Tanzania. Not long after came a period working for CG Jensen (a subsidiary of Skanska) that gave him a further opportunity to live in central Tanzania. His African experiences influenced his herpetological interests and his lifelong interest in ethnography and African art. In 1978 he was placed in charge of overseeing the finances of one of Skanska's largest ever projects, the building of the harbor of Jeddah, Saudi Arabia, where he lived for about five years. Within Skanska Richard rose in the hierarchy and became the controller for all non-Swedish building sites run by the company and he was based for a time in London. In his position he visited many countries in which Skanska had

Fig. 1. Richard Wahlgren in his kitchen in Lund, Sweden, 2003. Photo by A.M. Bauer.

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projects, including Peru, Indonesia and Madagascar. He often stayed for some months and, in his spare time, organized a local network to inform him about reptiles found within a convenient distance of his office. Visits to more developed countries, like the United States, where he lived for a time in New York, provided him with opportunities to buy books, which had by then become another major focus of his interests—along with his continuing passion for reptiles (Fig. 2).

Ultimately, Richard turned down an extremely senior position at Skanska, as it would have required him to live in Stockholm and would have curtailed his travels. He remained as a controller, traveling the world until his retirement in 2009. From the mid 1980's Richard lived in an old house, built in 1876 on Prennegatan in Lund. This was owned by Richard's friend and an author of this tribute, Thomas Madsen, who from 1988 to 1989 renovated Richard's flat while Richard temporarily relocated to neighboring Malmö. These modifications gave Richard a usable second floor and provided (for a while) enough space for his ever-growing collections of books, artifacts and natural history objects. Eventually Richard rented another flat some distance away, his "cabinet" or "annex" where duplicate publications, specimens and other overflow was housed (Fig. 3). He remained busy for the remainder of his life, taking courses at the University of Lund, traveling in Europe and beyond, sometimes in organized groups, keeping up with herpetology by attending conferences and, of course, hunting for books.

Richard was an active member of several organizations to which he brought his special energy, ideas and accounting experience. He was a founding member of the International Society for the History and Bibliography of Herpetology. The idea for the ISHBH began in 1996 at a workshop on book collecting held at the meeting of the Society for the Study of Amphibians and Reptiles at the University of Kansas. It received further support at the History of Herpetological Exploration symposium held the following year at the Third World Congress of Herpetology in Prague. The actual foundational meeting was at the combined meeting of the Society for the Study of Amphibians and Reptiles, The Herpetologists' League and the American Society of Ichthyologists and Herpetologists of Ichthyologists at the University of Guelph, Canada in 1998. There Richard was elected as the first chairman of the society. He was very "hands-on," checking all the articles in the *Newsletter and Bulletin* (later *Bibliotheca Herpetologica*) personally and running the annual meetings in his own inimitable way. Any attempt to deviate from Richard's agenda would not be tolerated and he would get things back on track as soon as possible, wielding the small gavel that he always brought to business meetings.

The nature of the membership of the ISHBH made it an unwieldy organization. Its membership, which fluctuated between about 100 and 140 was worldwide but with the greatest number of members in the United States and Sweden. This necessitated parallel payment systems and no matter where the journal was printed, about half of the mailings incurred high overseas postage costs. Further, many amateur members of the society, although interested and knowledgeable, were not in a position to contribute manuscripts to the journal, so Richard was constantly looking for authors. A high point in the ISHBH for Richard was the 2007 symposium "The Herpetological Legacy of Linnaeus—A Celebration of the Linnean Tercentenary" held at the Joint Meeting of Ichthyologists and Herpetologists in St. Louis, Missouri. The proceedings of this symposium were published as a special double issue of *Bibliotheca Herpetologica* 9(1–2) in 2012.

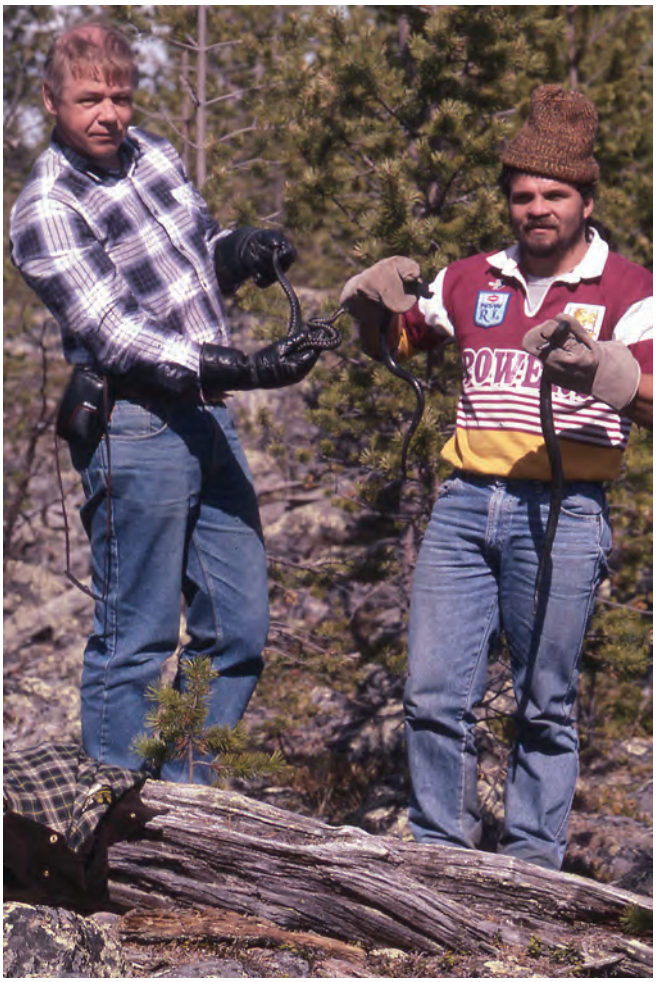

Fig. 2. Richard Whalgren and Bryan Cantle in Jukkasjärvi, in the extreme north of Sweden, where Richard and Bryan assisted Thomas Madsen and Stefan Andersson in the their study of adders in 1994. Photo by T. Madsen.

Keeping the ISHBH going was no trivial task, but Richard felt that the society needed his guiding hand and there was never any thought of replacing him as chairman until 2019, when in preparation for the annual meeting in July, which he ultimately was unable to attend, he contacted one of us (AMB) and expressed an interest in stepping down in about a year's time. Richard was also an active member of the Swedish Herpetological Society (Sveriges Herpetologiska Riksförening) from its origin in 1971 and participated in other herpetological and bibliophilic societies as well.

Fig. 3. Richard Wahlgren in his "Cabinet" in Lund, Sweden in 2010. Photo by A.M. Bauer.

Remembrances of Richard Wahlgren

I met Richard for the first time in a reptile pet shop in the Swedish town of Malmö in 1969. He had come to the pet store to have a look at the snakes that were on sale. Richard was interested in one of them, but I must admit I have forgotten what species it was that he wanted to buy. I told him that my mate Erik and I had supplied many of the snakes on display and that he could buy one from us at a wholesale price. In those long-gone days Richard was studying economics at the university in the nearby town of Lund and he happily accepted my offer.

Some years later I and others of Richard's friends were studying biology at Lund University. It was Richard, however, who was the first among us who was able to move to the tropics with all its amazing herpetofauna. Richard was employed as an internal auditor at the Swedish construction company "Skanska" and in 1973 he moved to the Ruaha River Valley in Tanzania where the company was building a hydropower plant. Some months later I, along with two of Richard's other friends, Thomas Håkansson and Gösta Eggertsen, visited him to try to do some serious "herping." However, in those days none of us had any real experience in finding "herps" in the tropics so our results were pretty meagre!

In 1975 Richard moved from the Ruaha River Valley down to the adjacent lowland, close to the village of Kidatu, were the company was building a sugar mill. In the area Richard organized a very efficient system to be able to collect the local herpetofauna. It was the same as that used by C.J.P. Ionides in the Newala District of Tanzania during the 1960s. When a person found a snake that person should remain at the site and then someone else would be sent to run to Richard who would then come and collect the specimen. If I recall things correctly, for a small snake like a Brown House Snake (*Boaedon fuliginosus*) Richard would pay the person who first found the snake about 10 US cents, for larger one like an Olive Sand Snake (*Psammophis mossambicus*) 50 US cents, but for a cobra or mamba he could pay up to US $2. This system worked like a charm and very soon Richard did not have enough space to keep all of the collected reptiles in his house so he got the company to build him a special "reptile house." I visited Richard when Tanzania's first reptile house was officially opened to the public in 1975 (Fig. 4).

In 1977 Richard, and his reptile house, moved to the Mtibwa Region in Tanzania. Richard got the same "reptile report system" up and running and he and I caught lots of the snakes reported in the area. Green mambas (*Dendroaspis angusticeps*) were very common and we caught many (see Fig. 5). That same year Richard, my girlfriend, Monika Osterkamp, and I drove down to Mpulungu at the southern tip

Fig. 4. Richard Wahlgren at the opening of his reptile house in Tanzania in 1975. Photo by T. Madsen.

Fig. 5. Richard Wahlgren (left) and Thomas Madsen (right) catching a green mamba (*Dendroaspis angusticeps*) in Tanzania in 1977. Photo by Monika Osterkamp.

of Lake Tanganyika in northern Zambia to try to catch water cobras, *Naja* (*Boulengerina*) *annulata*. We only found one, but Monika and I returned to Mpulungu in 1978 and in the three years we stayed there we found large numbers of them.

Richard also visited me on several occasions in Australia, often helping me with my field work in the Top End of the wet-dry tropics. In October–November 2010 he assisted me with my fieldwork on Frill-necked Lizards (*Chlamydosaurus kingi*). As these lizards are quite big and can give a very nasty bite, Richard had to hold them while I took a blood sample. Consequently, Richard is a co-author is one of the publications that came out of the 10-year study (Ujvari et al., 2015).

I could write a whole encyclopedia account about my "herping" trips with Richard in Africa and later on in Australia, but I will end here! Richard was one of my closest friends and I miss him dearly!

Bwana nyoka tu kama Richard.

Thomas Madsen

One of the founders of the International Society for the History and Bibliography of Herpetology has passed away. The seemingly inconspicuous dash between the dates of Richard's birth and death represents a full and rich life. Below I have recalled a handful of personal remembrances from my time together with him.

Richard and I had realized early on that we were both collectors and that interest in herpetological literature united us. We met on a regular basis either at Richard's home on Prennegatan in Lund or in Torna Hällestad, a nearby village (Fig. 6). I had to move there, away from him, if I wanted to have any chance of having the largest herpetological book collection in the neighborhood! Our gatherings were always accompanied by interesting food and not infrequently by beer-filled laughter. On March 31, 2019 it was again my turn to host. To convey at least something from this evening, I triumphantly pulled out a copy of *Histoire Physique, Politique et Naturelle de l'Ile de Cuba. Part 3, Reptiles* (Cocteau and Bibron, 1841–1843). Richard shone like the sun and immediately began an animated discussion about whether "butchered" books (with plates removed and sold by plate dealers) may be restored to their former glory, and if so in what way and, moreover, by whom. We never got to see each other again.

It was Richard who introduced me to the classic works on reptiles and amphibians, and names such as Roesel von Rosenhof, Spix, Seba, Wied-Neuwied, and Adler were unknown to me prior to our numerous, confidential conversations. Naturally, showing off new acquisitions was always a delight and we were amused by each other's purchases. The tone was never vicious or begrudging and the discussion inevitably and seamlessly turned to the prospect of our own possible future finds. I will never forget the April Fools' Day when I had copied and pasted some random French text into an email and then claimed to have found Anderson's incomparable and exceedingly rare *Zoology of Egypt. Vol. 1, Reptilia and Batrachia* in a small antiquarian bookshop in Lyon. Richard's happiness for me was hard to mistake and he also confided that he was surprisingly pleased with his black and white "counterfeit" published by J. Cramer and Wheldon

Fig. 6. Richard Wahlgren enjoying himself in the library of Didrik Claesson in Torna Hällestad, Sweden on November 15, 2014. Photo by D. Claesson.

& Wesley. However, we both managed to obtain original copies just in time to share each other's success.

Many other pranks lay ahead of us. On an expedition to the legendary bookseller Karl Ziegan on Potsdamer Straβe in Berlin Richard had found a humongous lithographic stone the first morning which I was assigned to carry the whole day, after which he turned up an old print on Australian reptiles. He must have recognized my undisguised joy at seeing this coveted publication because on my birthday a week later, Richard turned up with a big package. Wrapped in old newspapers and other debris lay the small offprint. Our collecting rivalry never got more serious than that. I could also mention the time we went full throttle to a newly opened antiquarian bookshop in Lund owned by the colourful Christian Irhammar in hopes of interesting finds, but unfortunately, we did not find anything on that occasion.

Recently I visited the auction house that is handling Richard's estate. I mentioned to Torgny Schunnesson, who is collating the books, that this felt all wrong. Torgny looked somewhat puzzled and wondered "Do you mean that the books should be in your library instead?" "Not at all, they should be with Richard." It makes you think of all the previous owners that once have enjoyed the older books in your collection. And all the future owners. It is an old truth that you cannot really own anything, just borrow it for a little while.

The very last time I walked around in Richard´s house was in company of his sister Agneta Rydin. She showed me some boxes filled to the brim with catalogues from antiquarian book dealers of the past. Many of them have Richard´s annotations. Books that he obtained and books that he missed. The careful building of a library over many decades. The satisfaction in finding a long sought-after work and the frustration of just missing one. All part of the joy of creating a collection. It is somewhat sobering to browse through these notes, now when Richard is gone, his bookshelves are empty, and everything will go under the auctioneer's hammer.

I am now sitting with my childhood herpetological scrapbook. The first clip is from a children's magazine and deals with how to nail together a wooden box for one's tortoises, followed by a eclectic mix of black and white photos taken and developed by my older brother, illustrations cut from dust jackets, a ticket to an itinerant snake exhibition, and sketches of future terraria. Then the invitations to the local herpetological society's meetings appear and I find what I am looking for**:** the field trip on May 22, 1977 to a nearby Grass Snake spot. Richard was at home from his exile in Africa and our conversation was hastily led on to chameleons. Our knowledge turned out to be surprisingly modest, but nonetheless our bold speculations rippled like a stream in spring. It was there and then I met Richard for the first time. It is so sad that we will never talk again. We would talk about everything between the heaven and earth of herpetology, and talk about what became dear Richard's lifelong passion... and what is likely to be my own.

Didrik Claesson
Friend and former holder of the second largest herpetological library in Sweden.

For me it was a relatively long and slow process to get to know Richard. In the early 1990s, we often attended the same annual meetings and congresses of the National Swedish Herpetological Association, which usually included Richard's traditional book auctions. Slowly but surely our shared interest in herpetological books brought us together, as did the fact that we both were employed at the same international construction company, Skanska.

Richard, who joined Skanska back in 1973, worked as an internal auditor with the whole world as his field of work, and he reported directly to the company's top directors. As a fairly recently graduated civil engineer, I was, of course, very impressed by his solid international experience and connection with the top executives. Later on, when I finally

managed to get a position abroad, Richard would visit me in connection with his audits of hydroelectric projects both in Colombia and Peru (Fig. 7). All our free time, both night and day, was, of course, spent in the field looking for reptiles and amphibians. Richard was an experienced field herpetologist, whether down in the rainforest or high up in the Andes it was always a pleasure to have him as company.

Richard always kept his eyes open for local ethnography and all kinds of herpetological literature during his travels. With platinum cards on all the main airlines, he never had problems with overweight luggage when it came time to transport his discoveries home.

I also visited Richard several times at his home in Lund. Richard was happy to show off his collections, always with great joy and enthusiasm. However, there was never enough time to go through even a fraction in the way I wanted. I especially remember when my family and I travelled by car from Stockholm to Copenhagen and stopped to spend the night at Richard's house. For dinner he had cooked food that would suit my then three-year-old daughter, Spaghetti Bolognese. With horror, in my mind I can still see her in front of me, sitting on one of Richard's antique 17th-century chairs with meat sauce all over her face, hands, and arms. But Richard took it in stride and just said that antiquities are to be used, otherwise they will not develop the correct patina. That night we slept in "the annex," a basement room equipped with a kitchen, toilet and large sofa bed with room for three people. Richard had rented the space to house books that could not fit in his home, but also a collection of ethnographic and natural history artifacts. In the morning, my wife claimed that it was just as if she had been living a part in the movie "*Night at the Museum.*"

Richard often managed to plan his work trips to coincide with herpetological congresses around the world. In this way, he got to know many like-minded people, including leading herpetological book collectors and historians such as Aaron Bauer, Ronald Javitch, and Kraig Adler. This eventually led Richard, as the leading force, along with others, to establish the International Society for the History and Bibliography of Herpetology in 1998. Richard immediately enlisted me without asking, something for which I am very grateful.

Richard retired in 2009, after 36 years on duty with only three days of sick leave, one of which was due to malaria. The next thing he did was to enroll in Lund University. There were some problems recalculating his nearly 50-year-old grades to show that he had the appropriate competence. Richard never stopped learning more about what he was interested in, and he never stopped sharing his knowledge. For more than 25 years, we had irregular email, telephone and in-person conversations—mostly, but not exclusively, about everything in the world to do with herpetology. It ended far too soon.

Mikael Lundberg
Herp association friend, book collector, and Skanska colleague.

Fig 7. Richard Wahlgren in the cloud forests close to Oxapampa on the eastern slopes of the Peruvian Andes, March 2011, on a visit to Mikael Lundberg. Photo by M. Lundberg.

I first met Richard in the mid-1990s, Our shared love of books and our experiences traveling, him in his work for Skanska and me in pursuit of geckos (and perhaps our shared preference for shorts over long pants when possible) drew us together quite quickly.

Fig. 8. Richard Wahlgren at Constantine Rafinesque's tomb in Lexington, Kentucky, 27 July 2006. Photo by A.M. Bauer.

Fig. 9. Richard Wahlgren in 2003 with statue of Carl Linnaeus as a student in Lund, Sweden. Photo by A.M. Bauer.

Over much of the last two decades, the ISHBH held its annual meetings in conjunction with the Society for the Study of Amphibians and Reptiles (SSAR) in North America. Richard normally came to these meetings and more often than not he would drive with my students and me from Villanova, in suburban Philadelphia, to wherever the meetings were being held. These excursions usually included some fieldwork en route or visits to historical sites of herpetological interest (and, of course, any and all bookstores passed along the way). Invariably, Richard's first act upon arriving at my home was to go through my duplicate books and reprints and to share with me the stack he always brought with him from Sweden. On the road Richard was a great amusement for my students. He learned all of their names and projects and took a real interest in their progress, asking how they were doing years later. In return, the students would enlighten Richard about subtleties of American slang. On one memorable trip through the Appalachians Richard asked us to explain the difference between rednecks and hillbillies.

Road trips with Richard always involved stops for hot coffee (even on a day in Texas when the temperature was 107°F/42°C and our vehicle had no working air conditioning). At night his requirement was beer. Once during an overnight stay in Arkansas he did not return from his solo trip to the beer store and we found him an hour later at the wrong motel, arguing with the manager that his key didn't work! Highlights with Richard were trips to the historical utopian settlement of New Harmony, Indiana where Thomas Say and others of the American scientific establishment of the early 1800s lived for a time, and to the tomb of Constantine Rafinesque (1783–1840; although someone else is actually buried there), inside the administration building of Transylvania University in Lexington, Kentucky (Fig. 8).

Group outings with the ISHBH membership were also always enjoyable. Thanks to the courtesy of many librarians we were able to take special behind-the-scenes trips to the Academy of Natural Sciences in Philadelphia, the Linda Hall Library in Kansas City, the Providence Athenaeum, and many others. A real treat for Richard was holding Peter the Great's own copies of some of the great natural history works of the early 18th century in the library of the Zoological Institute of the Russian Academy of Sciences when the ISHBH met there in 2003.

I was also lucky enough to visit Richard several times in Lund and to see him in his "natural habitat" surrounded by his books, African art, and old natural history specimens. His home had the feeling of a museum and was as full as it could be. When I stayed with him, there was just enough room between the bookshelves and furniture to place a mattress on the floor. Richard also showed me the sights of Lund (always walking, because Richard would never drive if he could walk) and other places in southern Sweden, including the birthplace of Linnaeus (Fig. 9) in Råshult and the first IKEA!

One of my first and most memorable trips with Richard was a 1995 excursion by train from Bonn, along with Kraig Adler, to visit every antiquarian bookshop in Köln, a trip

that highlighted the odd combination of camaraderie and competition that characterizes book collecting. On many trips I flew into nearby Copenhagen and Richard picked me up and we continued on to go to the European Herpetological Meetings, planning our trips so we could visit bookshops on the way. These book hunts took us to Germany, Poland, the Czech Republic, the Netherlands, Belgium, Luxembourg, Slovakia, Hungary, and Lithuania. Richard did not like listening to music in the car, with the exception of an endless loop of African drum beats, so we had plenty of opportunities to discuss books on the long rides. He covered transportation costs and I paid for the hotels. In Vilnius, Lithuania we realized too late that neither of us knew how to say "reptile" in Lithuanian so we had to point to pictures to indicate what we were looking for. Eventually we turned up a few local titles. In Rostock, Germany we found three good bookstores with desirable items in the windows, but we had arrived on a public holiday, so we had to make a special trip back a few years later.

Aside from book hunts, we took several research trips together as well. One was to Wrocław, Poland to look, with our colleague Bartosz Borczyk, into the early 19th century collection of Johann Ludwig Christian Gravenhorst, partly destroyed and partly lost within the collection that survived bombing during World War II. We took two study trips to the even older Linck Collection in the small town of Waldenburg, Germany (Fig. 10) and ultimately we published a paper (Bauer and Wahlgren, 2013) on this historical museum with specimens dating back to the mid-17th century. This was great fun. We stayed in a small pension near the collection where we were the only guests. The proprietor brought us the short menu (10 items) and give us a half hour to look it over. After finally taking our orders (Hawaiian pizza for me and roast beef for Richard) he said, "Gut. Zweimal Schnitzel!" As it turned out, schnitzel, which wasn't even on the menu, was, in fact, the only thing he had to offer.

I had been looking forward to seeing Richard again at the ISHBH meeting in 2019 in Utah, but in the end he decided not to come and shortly thereafter he passed away. I was shocked when Didrik told me of his death, and many of my past students were likewise stunned. Richard always stood out wherever he went, he attracted looks but also made friends easily. Indeed, Richard was in part defined by his quirky traits, but in greater proportion by his kind and gentle spirit. He was a sweet man whose presence improved any gathering.

To see his books come up for auction is bittersweet. It is sad to see the books out of the context of Richard's home and the joy they gave him, but then again they are re-entering the market and will bring happiness to others, including many of his friends, who will be glad to own a book that was once his and was part of one of the greatest private herpetological libraries in the world. Richard's collecting interest was broad, with an emphasis on African herpetology and Scandinavian natural history, but all fine antiquarian works were fair game.

Fig. 10. Richard Wahlgren at the Naturalienkabinett Waldenburg, Germany, 25 September, 2005. Photo by A.M. Bauer.

He did not really collect journals or reprints, although of course he had some, mostly older separates and recent ones given to him by his friends. He had many rare books in his possession and used the services of Mirko Kloverberg who made him lovely bindings at bargain prices. If I had to pick Richard's favorite books I would name his restored copy of the illustrated *Museum Adolphi Fridereci* (Linnaeus, 1754) (Fig. 11) and Anderson's (1898) *Zoology of Egypt*, *Vol. 1, Reptilia and Batrachia*.

Like many other ISHBH members I worried that that the society, which along with his library was an important part of Richard's legacy, was in danger of floundering without its chairman. I think that Richard would be happy to know that the ISHBH lives on, driven in part by the desire of his friends to do justice to all the work that he put into the promotion of our shared passion for this particular corner of herpetology.

Aaron M. Bauer
Traveling companion and fellow book-hunter.

References

Anderson, J. 1898. *Zoology of Egypt. Volume First. Reptilia and Batrachia*. Bernard Quaritch, London. lxv, 371 p., 50 plates.

Bauer, A. M. & Wahlgren, R. 2013. On the Linck collection and specimens of snakes figured by Johann Jakob Scheuchzer (1735) – the oldest fluid-preserved herpetological collection in the world? *Bonn Zoological Bulletin* 62(2):220–252.

Cocteau, J. & Bibron, G. 1841–1843. Reptiles *in* Ramón de la Sagra, D., *Histoire Physique, Politique, et Naturelle de l'Ile de Cuba.* Arthus Betrand, Paris, xviii, 242 p., *Atlas,* 31 plates.

Linnaeus, C. 1754. *Hans Maj:ts Adolf Frideriks vår Allernådigste Konungs Naturalie Samling Innehållande Sålsynte och Främmande Djur, som Bevaras på Kongliga Lust-slottet Ulriksdahl; Beskrefne och Afritade Samt på Nådig Befallning. Museum S:ae R:ae M:itis. Adolphi Friderici Regis Svecorum, Gothorum, Vandalorumqve. Hær. Norv. Duc. Slesv. Hols. Storm.*

Fig. 11. Richard proudly showing off his restored copy of Linnaeus's illustrated work on the Museum Adolphi Friderici (Linnaeus 1754) at his home in Lund, Sweden in 2011. Photo by A.M. Bauer.

Ditm. Com. Oldenb. Delmenhorstiæ. &c. &c. in quo Animalia Rariora Imprimis, et Exotica: Quadrupedia, Aves, Amphibia, Pisces, Insecta, Vermes Describuntur et Determinantur, Latine et Svetice cum Iconibus. Tryckt uti Kongl. Tryckeriet, Stockholm/E Typographia Regia, Holmiæ. [4] xxx, 96 p., [7] 33 plates.

Ujvari B., Fisher P., Rydell J., Wahlgren R., Wright B. & Madsen T. 2015. Population demography of frillneck lizards (*Chlamydosaurus kingii*, Gray 1825) in the wet-dry tropics of Australia. *Austral Ecology* 40(1):60–66. [published online in August 2014].

Chronological lists of herpetological articles authored by Richard Wahlgren prepared by Mikael Lundberg (modified from *Snoken* 49(1) [2020]). This list excludes ISHBH news items (both signed and unsigned) prepared by Richard.

Wahlgren, R. 1972. Furuviks ormexpo. *Snoken* 2(5):30–31.

Wahlgren, R. 1972. Krokodil avskedsgåva. *Snoken* 1(4):21.

Wahlgren, R. 1972. Latinska namnen inom Serpentes samt något om klassificering. *Snoken* 1(3):55–60.

Wahlgren, R. 1972. Protokoll fört vid Sveriges Herpetologiska Riksförenings kongress i Helsingborg, Gustav Adolfs Ungdomsgård den 19 februari 1972. *Snoken* 1(4):3–7.

Wahlgren, R. 1972. Protokoll fört vid Sveriges Herpetologiska Riksförenings årsmöte i Stockholm, Barnavårdsnämndens Sammanträdeslokaler, Skärholmen den 23 september 1972. *Snoken* 2(4):6–10.

Wahlgren, R. 1973. Ny litteratur: Sjögren, B. Våra groddjur, ödlor och ormar. *Snoken* 3(3):20.

Wahlgren, R. 1973. Om geckoödlornas vidhäftningsförmåga. *Snoken* 3(3):16.

Wahlgren, R. 1973. Protokoll fört vid Sveriges Herpetologiska Riksförenings kongress i Lund, Göteborgs nationshus, 1973–02–24. *Snoken* 3(2):6–12.

Wahlgren, R. 1973. Tidskriften Fauna. *Snoken* 3(3):21–23.

Wahlgren, R. 1974. Ormfaunan i Kidatu, Tanzania. *Snoken* 4(3):19–27.

Tramontano, R., Wahlgren, R. & Lardner, B. 1997. Third World Congress of Herpetology. *Snoken* 27(3–4):4–5.

Wahlgren, R. 1998. Terrariets historia. *Snoken* 28(1):3–6.

Wahlgren, R. 1999. Fine antiquarian books on herpetology in recent catalogues. *Newsletter of the International Society for the History and Bibliography of Herpetology* 1(1):5–15.

Wahlgren, R. 1999. Herpetology in the *Transactions of The Royal Swedish Academy of Sciences*. A listing of titles 1939–1825, translated into English, with annotations and unabridged translations of selected contributions and a brief history of the Academy. *Newsletter and Bulletin of the International Society for the History and Bibliography of Herpetology* 1(2):7–26.

Wahlgren, R. 2000. *Encyclopedia Londonensis* (1796–1829) and *A Genuine and Universal System of Natural History*, vol. 12 (1809 or 1810)—two little known contributions in the history of herpetology. *Newsletter and Bulletin of the International Society for the History and Bibliography of Herpetology* 2(1):20–26.

Bartholomew, B., Wahlgren, R. and A. M. Bauer. 2001. Recent literature on the history and bibliography of herpetology: 1. *Newsletter and Bulletin of the International Society for the History and Bibliography of Herpetology* 3(1):14–23.

Wahlgren, R. 2003. About the Cover: Johann Jacob Scheuchzer and the *Physica Sacra*. *Newsletter and Bulletin of the International Society for the History and Bibliography of Herpetology* 4(2):5–6.

Wahlgren, R. 2003. About the Cover: "The Rattle-Snake and the Mocking-Bird" in *Book of the World* (1852). *Newsletter and Bulletin of the International Society for the History and Bibliography of Herpetology* 5(1):5–8.

Wahlgren, R. & David, P. 2005. Distinctive collection of herpetological books on public auction. *Bibliotheca Herpetologica* 5(2):4–6.

Wahlgren, R. 2006. About the Cover: Oates' vine snake, *Thelotornis capensis oatesii,* described by Albert Günther in 1881. *Bibliotheca Herpetologica* 6(1):4–5.

Wahlgren, R. 2007. Carl von Linné som herpetolog. *Snoken* 37(4):14–20.

Krecsák, L. & Wahlgren, R. 2008. A survey of the Linnaean type material of *Coluber berus*, *Coluber chersea* and *Coluber prester* (Serpentes, Viperidae). *Journal of Natural History* 42(35–36):2343–2377.

Wahlgren, R. 2008. Recent literature. *Bibliotheca Herpetologica* 7(2):33–34.

Wahlgren, R. 2010. About the Cover: *Pipa* from an original watercolor by Maria Sibylla Merian. *Bibliotheca Herpetologica* 8(2):5.

Wahlgren, R. 2012. Carl Linnaeus and the Amphibia. *In*: Bell, C. J. (editor), The Herpetological Legacy of Linnaeus: A Celebration of the Linnaean Tercentenary, *Bibliotheca Herpetologica* 9(1–2):5–38.

Pauwels, O.S.G. & Wahlgren, R. 2012. Book Review: *The Eponym Dictionary of Reptiles*. Beolens, Bo, Michael Watkins, and Michael Grayson. 2011. The Johns Hopkins University Press, Baltimore, i–xiii + 296 pp. *Bibliotheca Herpetologica* 10(1):28–31.

Pauwels, O.S.G. & Wahlgren, R. 2012. Book Review: Beolens Bo, Watkins Michael, and Grayson Michael (2011), *The Eponym Dictionary of Reptiles*, The Johns Hopkins University Press, Baltimore. *Russian Journal of Herpetology* 19(4):352–355.

Bauer, A.M. & R. Wahlgren. 2013. On the Linck collection and specimens of snakes figured by Johann Jacob Scheuchzer (1735)—the oldest fluid-preserved herpetological collection in the world? *Bonn zoological Bulletin* 62(2):220–252.

Wahlgren, R. 2014. Recent literature 2. *Bibliotheca Herpetologica* 11(1–2):56–58.

Ujvari, B., Fisher, P., Rydell, J., Wahlgren, R., Wright, B. & Madsen, T. 2015. Population demography of frillneck lizards (*Chlamydosaurus kingii*, Gray 1825) in the wet-dry tropics of Australia. *Austral Ecology* 40(1):60–66. [Published online August 2014.]

Bauer, A. M. & Wahlgren, R. 2015. Über die Linck-Sammlung und die von Johan Jacob Scheuchzer abgebildeten Schlangen—die älteste alkoholkonservierte herpetologische Sammlung der Welt? *Sekretär* 15(1):57–68. [Translated by W. Böhme.]

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International Society for the History and Bibliography of Herpetology

Bibliotheca Herpetologica

Book Review

The Poetics of Natural History (Second Edition)

Christopher Irmscher, 2019. New Brunswick, New Jersey (Rutgers University Press), xxii, 379 p.
$75.00 (hardback, ISBN 9781978805873) and $39.95 (paperback, ISBN 9781978805866).

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According to Oxford Languages, poetics is defined as "the study of linguistic techniques in poetry and literature." Merriam-Webster extends this definition to encompass a treatise on aesthetics, a branch of philosophy that deals with the principles of beauty and artistic taste. *The Poetics of Natural History*, the first edition of which was published in 1999, goes beyond the mere literary realm to include an updated and revised examination of the text, illustrations, and artwork accompanying selected natural history publications and museums in North America prior to the publication of Darwin's *Origin of Species*. The book does not weigh in extensively on the technical skill of the writers and illustrators, although that is mentioned, but on the interpretation of literature and artwork concepts of natural history, particularly collecting, museums, and the naturalists themselves in the "emerging wilderness" of North America away from the stifling authority of European science and aesthetics.

The author, Christopher Irmscher, a Professor in the Wells Scholars Program at Indiana University, notes that he has not striven for completeness in discussing the poetics of early American naturalists, focusing instead, in six chapters, on the progressive evolution of the collector as being apart from nature to a realization that humans are simply another element of the natural world. Irmscher notes his fascination with natural history museums, which he found both "exhilarating and unsettling" even as a child. In this regard, he sees the naturalist (or collector, a term he uses for these early naturalists) as both "apart from and a part of his collection," yet wondering about his [the collector's] place, if any, in it. I am not sure whether these early naturalists would recognize this motivation for their collection, or whether they were truly "often uncertain about their own place in a land that was theirs before they were the land's"; perhaps they were simply fascinated by the diversity of the New World and sought to learn as much about it as possible. Much of the poetic commentary by Irmscher strikes me as creating a story long after the fact, thus reflecting the personal *opinions* of the author rather than the intent of the naturalists who lived more than 150 years ago. One may look at the texts and illustrations and put these into the context of their time, which the author does quite well in many of the chapters, but I think there is danger in ascribing post hoc motivational cognition to the naturalists themselves. Were Peale's exhibitions at his Philadelphia Museum, for example, really a version of "art as play," or did they merely express his desire to bring the wonders of nature to an American audience?

One of Irmscher's premises is that early American naturalists collected themselves when collecting nature, whether through the physical objects or through their words or images in letters, diaries, travel notes, essays, and in other written forms. I suppose that's true for all of us to one extent or another. The book introduces these and other topics and the author's intentions and approach in an 11-page introduction that will, at times, probably confuse and infuriate contemporary naturalists and scientists with regard to the strange world of literary criticism (e.g., the concept that natural history is simply a guise for Western imperialism, as promoted by some authors [p. 9], or that the logic of a museum collection demands that the viewer forget the origin of the items collected [p. 83]). Irmscher makes clear he does not agree with these off-the-wall criticisms, but merely provides reference to them as background material.

The book is divided into two parts, "Displaying" (three chapters focusing on early collecting and displaying natural history objects for mostly aesthetic or commercial reasons) and "Representing" (three chapters aligned more to the scientific interpretation of nature through text, illustration, or the promotion of preconceived ideas in the years preceding Darwin). The text focuses on a number of naturalists (used loosely with regard to P.T. Barnum, a notorious huckster, but definitely a collector): John and William Bartram (1: *America Transplanted*), Charles Willson Peale (2: *Collection and Recollection*), P.T. Barnum (3: *Collecting Human Nature*), numerous naturalists describing rattlesnake behavior (especially with regard to "charming"), including Benjamin Smith Barton (1766–1815), William Bartram again, and John Edwards Holbrook (1796–1871) (4: *The Power of Fascination*), John James Audubon (5: *Audubon at Large*), and Louis Agassiz (6: *Agassiz Agonistes*). The author does

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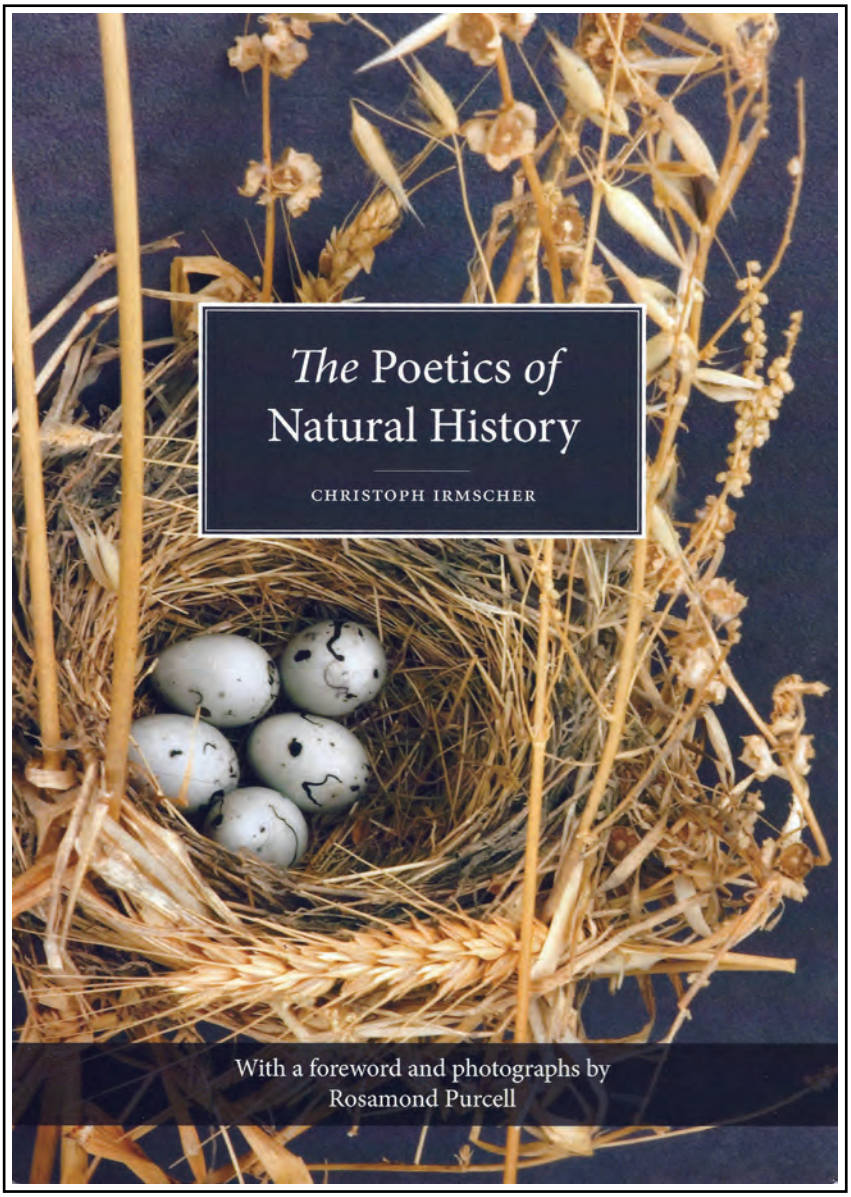
not really indicate why these men were chosen except to say that none of these individuals, with the exception of William Bartram, has been "of great interest to the literary historian." Given an objective of illustrating the evolution of poetic and thematic philosophies in natural history, Irmscher has chosen well.

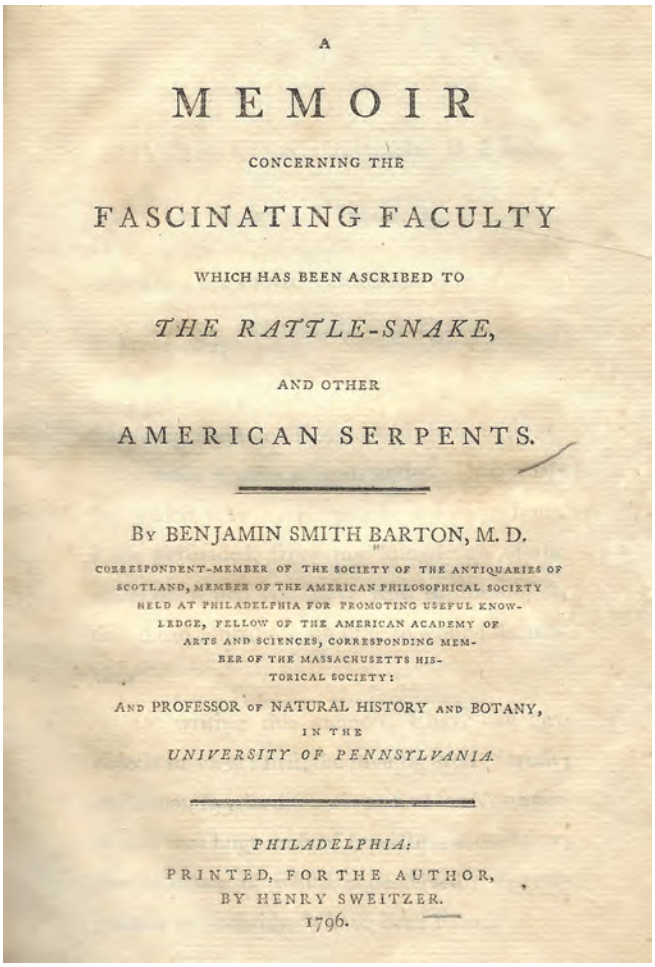
Chapter 1 covers the botanists John (1699–1777) and William (1739–1823) Bartram, and focuses mostly on the father's botanical collecting, particularly for Peter Collinson, a textile merchant in England with a penchant for exotic plants for his garden. John Bartram did this not only for the love of plants, but also for financial compensation. Irmscher recounts the numerous letters between Collinson and Bartram, reprinting many exchanges between them in the epistolary conversation style of the day. Collinson was always in search of new and exotic plants, and Bartram was often in search of delayed payment. The language of these letters is flowery and exaggerated, but it was the style of the day.

The second part of the chapter reviews the discovery of and intense interest in the Venus Flytrap (*Dionaea muscipula*) and beautiful but rare Franklinia (*Franklinia alatamaha*), and includes a recounting of William Bartram's travels and observations. Irmscher's background material concerning interest by European and American botanists in these plants is quite illuminating, as is his recounting of the literary value attributed to Bartram's *Travels* by some modern critics. Irmscher notes that Bartram's only book has received mixed reviews among literary scholars, as some consider its facts are "no longer of much value today" [p. 44]. There are many modern naturalists, however, that would beg to differ (e.g., Harper, 1958; Hallock and Franz, 2017). *Travels* may indeed be "first and foremost a natural history collector's account" and not a tidy literary narrative, but Irmscher lets us know that Bartram wanted his book to be more than just a "dignified botanical shopping list." History has proven him correct.



Chapter 2 covers one of the first natural history museums in the United States, Charles Willson Peale's (1741–1827) Philadelphia Museum (a.k.a. Peale's American Museum). Peale is best known today for his portrait paintings of leading figures of the American Revolution, but he also organized the first U.S. scientific exploration in 1801 and his museum was among the first to adopt Linnaean taxonomy. Peale was much ahead of his time in many respects, such as painting natural dioramas as background for his stuffed specimens, something European museums did not do. He thought women should be introduced to the wonders of natural history, and that they "had an equal right with our sons to our instructions." He provided a guidebook (*Scientific and Descriptive Catalogue of Peale's Museum*) to his collection, and eventually he learned well the art of taxidermy to prepare his specimens. However, the first specimen he tried to preserve was Benjamin Franklin's angora cat (Missy Hooper), which did not go well. Peale was also among the first innovators to carve limbs to simulate muscles over which the preserved skin was applied, thus making his specimens appear naturalistic.

Although there is much interesting information in this chapter about natural history museums and their evolving development (e.g., museum had originally been a term for a library, thus the "Book of Nature"), Irmscher is after all a literary poeticist, and he spends a great deal of time critiquing Peale's self portrait of *The Artist in His Museum*. I found myself reading this section with a skeptical eye, wondering how so much interpretation could be crammed into a single painting of the artist (Peale)



A

MEMOIR

CONCERNING THE

FASCINATING FACULTY

WHICH HAS BEEN ASCRIBED TO

THE RATTLE-SNAKE,

AND OTHER

AMERICAN SERPENTS.

By BENJAMIN SMITH BARTON, M. D.

CORRESPONDENT-MEMBER OF THE SOCIETY OF THE ANTIQUARIES OF SCOTLAND, MEMBER OF THE AMERICAN PHILOSOPHICAL SOCIETY HELD AT PHILADELPHIA FOR PROMOTING USEFUL KNOWLEDGE, FELLOW OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES, CORRESPONDING MEMBER OF THE MASSACHUSETTS HISTORICAL SOCIETY:

And PROFESSOR of NATURAL HISTORY and BOTANY, IN THE *UNIVERSITY OF PENNSYLVANIA.*

PHILADELPHIA:

PRINTED, FOR THE AUTHOR, BY HENRY SWEITZER.

1796.

Fig. 1. Benjamin Smith Barton's 1796 *A Memoir Concerning the Fascinating Faculty Which Has Been Ascribed to the Rattlesnake*. Barton obtained much of his information watching rattlesnakes in Peale's Philadelphia Museum. Author's collection.

opening a curtain to the main part of his museum. Every hand gesture, angle of the body, feather on a bird, and background subject is meticulously analyzed with symbolism attributed. The narrative is replete with flowing adjectives and adverbs ("most amusingly," "playful correspondences," "playful comment") from Irmscher and many other critics whose work he cites, which is distracting and irritating. One can still get the point across without all the superficial injection of descriptive sugar. Unfortunately for Peale, the U.S. Congress would not agree to take over his museum as a national treasure. Much of the collection was lost to a series of fires, and the rest passed on to the showman P.T. Barnum, the subject of Chapter 3.

P.T. Barnum (1810–1891) is seldom mentioned in connection with natural history museums, but he certainly was a collector of natural history objects that he displayed in his Barnum's American Museum and its traveling counterpart. It did not seem important to Barnum whether the object was real or fake, as long as it drew an audience and generated publicity for his numerous ventures. Irmscher notes that much of P.T. Barnum's fame rested "on the relentless propagation of fakes" [p. 133]. Indeed, Barnum openly admitted that certain objects were fakes, and managed to turn even such admissions into generating more revenue. Barnum extended the notion of collection into the human realm by including living "objects" of curiosity into his "museum" displays, such as persons with developmental oddities, dwarfism, or gigantism. Of course, Barnum had no interest in the science behind museum collection—it was all about his ego, promoted through dozens of updated versions of his autobiography (*The Life of P.T. Barnum*, later renamed *Struggles and Triumphs*) that kept the public's interest (but became obsolete the moment published) as a gullible public awaited the next version. Keeping the public's attention (and money) meant constantly coming up with new and even more outrageous "specimens." I am not sure this contributes anything about *Collecting Human Nature*, the title of Chapter 3, so much as being a sad commentary on those that promoted, believed in, and fostered such nonsense. Barnum, with his museum, autobiographies, and love of adulation, reminded me all too much of the current folly we see in politics today.

Chapter 4 is probably of most interest to herpetological historians and bibliophiles. This chapter shifts the focus of the book from mere collection, the subject of the first three chapters, to a reflection on the meaning of collecting, to wit, a fascination with biotic diversity and its presentation as a gateway to scientific understanding. Herpetology abounds throughout the book, but particularly in this chapter: Benjamin Smith Barton studied his rattlesnakes largely in Peale's Philadelphia Museum (see Barton, 1796; Figure 1); Agassiz was a frequent visitor with Holbrook, eventually writing a eulogy for his colleague (Agassiz, 1872); many of Bartram's observations have been corroborated (Adler, 2004), if flamboyantly told by modern standards. The chapter is constructed around a fascination with rattlesnakes in colonial America and in Europe. But fascination has two meanings—one revolves around the folk tale that rattlesnakes charm their victims, including humans, toward their doom. The second shifts to the naturalist's fascination with the biology of rattlesnakes as fact, not fiction. Thus, the chapter has two parts, each of which is excellent in terms of presenting the history of charming and the efforts of naturalists to set the record straight.

Through the second part of Chapter 4, the rattlesnake changes from an object of terror and superstition into one of enlightenment and curiosity. The chapter then goes on to examine the contributions of Holbrook's *North American Herpetology* (subheaded *Science from the Swamps*), and notes that "making sense of rattlesnakes came to be of pivotal importance in early American natural history" [p. 187]. As with other chapters, there are many illustrations that complement the text, including early renditions of rattlesnakes (e.g., James Gillray's 1782 etching of *The American Rattle Snake*) and four of Holbrook's lithographs. The chapter concludes with an examination of Oliver Wendell Holmes' *Elsie Venner: A Romance of Destiny* which appeared in 1861. Although charming (mesmerism) by rattlesnakes had long been

disproven by then, Holmes gives an intimate fictional account of the charming abilities (i.e., the power of fascination) of an 18– year old woman suffering from "ophiditis" (because Elsie's mother was bitten by a rattlesnake) and her subsequent unfortunate fate, naturally with its moral lessons. With a reliance on discredited premises, Irmscher posits that the novel became "symptomatic of the widening gap, whether real or imagined, between science and literature" [p. 196]. Although Irmscher's account of this poorly received novel is fascinating (pun intended), I don't think I'll be reading it.

Of course, Irmscher assesses the use of text and illustrations in a poetic sense rather than a technical scientific sense, which at times may cause modern naturalists to say "but that's not what [Holbrook, for example] was trying to convey." For example, contrary to Irmscher's opinion [p. 181] that Holbrook expressed "suppressed nationalism" when stating "…that there is not a reptile in Europe identical with any one of the United States" (in reference to our large southeastern rattlesnakes), Holbrook may have been stating an obvious fact. The intricate description of a turtle is not great literature for the most part, nor need it be in a scientific treatise. Considering that early descriptions of amphibians and reptiles were usually vague, inaccurate, imprecise, or way too inadequate prior to Holbrook, both in Europe and North America, Holbrook's accomplishments are even more remarkable given his Southern location and lack of access to the libraries and learned colleagues available in other parts of the world. Perhaps, however, this isolation actually allowed Holbrook to produce his masterpiece. I was pleased to see Irmscher adopt a supportive conclusion, rather than dismiss technical prose outright. He notes [p. 187]: "With Holbrook's book, this fascination [with rattlesnakes, in particular] ceases to be the *subject* of scientific discourse and instead becomes one of its *qualities*, at least in the best examples of such prose." Holbrook's volumes were a turning point in American natural history literature, both from a literary and scientific viewpoint, one that Irmscher so prominently recognizes.

Chapter 5 focuses on John James Audubon (1785–1851) and his magnificent *The Birds of America*. Here, Irmscher shifts from representing natural history through text to one, for the most part, of the visual arts in support of the text. He notes the progression of bird illustrations from Mark Catesby (1683–1749) through Alexander Wilson (1766–1813, who observed birds in Peale's museum) to Audubon, an evolving presentation of the bird from a simple (in form, not technique) illustrative posture to one of complex interactive behavior in nature. He extensively discusses the text in Audubon's *Ornithological Biography*, concluding that Audubon favors "*seeing* at the expense of *writing*" [p. 211, author's emphasis]. Audubon himself stated that "No true student of nature ought ever to be satisfied without personal observation when it can be obtained." True words—whether doing field work or citing literature from old sources. Unfortunately, Audubon was both a protector of birds and a ruthless hunter of them, a dichotomy Irmscher reports in gruesome detail. Audubon was obviously conflicted by this duality, as his writings in *Ornithological Biography* indicate. In many ways, this is a depressing chapter, showing the naturalist as dominated by the waste of life, even if the paintings were beautiful. According to Irmscher, *The Birds of America* marked the pinnacle of the "poetics of natural history," a time when "knowing the reasons why" and enjoying the reality of "things as they are" did not seem to be mutually exclusive.

After the recounting of Audubon's bird slaughters, I thought a discussion of natural historians could not get more depressing. In *Poetics* last chapter, Irmscher discusses the legacy of Louis Agassiz (1807–1873), renowned European naturalist and geologist who moved to the United States and founded the Museum of Comparative Zoology at Harvard. When he came to America in 1846, he was already one of the world's leading naturalists. As Irmscher narrates, he had more than a healthy ego, stating to his father as a young man that he wanted to be "the first naturalist of his time." In preparing the circulars for his planned *Contributions to the Natural History of the United States of America* (only 4 of 10 volumes were completed), he boasted "I do not think [Alexander von] Humboldt himself could obtain in all Europe put together such a subscription for so expensive a work." Unfortunately for Agassiz, his early laurels were tainted by his later actions—his refusal to accept evolution through natural selection and his deep racism. Both led him to pursue natural history to justify his positions, and each has permanently tarnished his legacy.

The chapter is divided into two parts. The first examines Agassiz's luxury expedition to Brazil and subsequent publication of *Journey in Brazil* in 1868, recounting his expedition. The second covers his attempts to justify his racism by examining physical characteristics of Africans and Indigenous Peoples in Brazil and comparing them to Caucasians in Europe and North America. Agassiz considered this a task of natural history, particularly through the collection of specimens and data; not discovery, but the "uncovering and happy recognition of what always had been there" [p. 271]. He obtained no new insights into the biology of the barrels of fishes he collected, according to Irmscher, since he had gone to Brazil primarily to show the distinct localization of species in different water basins. How they came to be that way and how the communities were structured was of no interest. Fishes were different in different basins because they had always been there, specially created. No hypotheses or explanations were necessary since he already knew the answer. Agassiz's series of stories in *Journey to Brazil* were not science, but a discourse on natural history "framed by a narrative written mostly from the informed tourist's point of view" [p. 271]. Ouch!

Agassiz's journey is well presented, and his collecting philosophy reminded me of a certain ichthyologist I knew (who will not be named) who insisted on vast numbers of specimens every time he collected, even if it jeopardized certain rare or limited-distribution species. Agassiz's collecting prowess is

contrasted with the journal of William James (1842–1910), who was a collector on that Brazilian expedition and later became a renowned psychologist. James became thoroughly disgusted with Agassiz and his collecting mania, but was even more put off by the monotony of the Amazon Basin and the day-to-day drudgery of hard fieldwork. Such a response will receive little sympathy from tropical research biologists, and one wonders what James expected when he signed on to the expedition. These contrasting narratives are interspersed by reference to previous naturalists who traveled the Amazon, especially Alfred Russell Wallace (1823–1913). Unlike Agassiz, Wallace had many trials and tribulations on the Amazon, lost all his specimens and notes when his ship sank, suffered greatly, yet wrote a self-reflective narrative (*Travels on the Amazon*) that indicated his *willingness to let himself be surprised* [p. 271, author's emphasis], something Agassiz with his luxuries, support crew, barrels of fish, and preconceived ideas never did.

The last part of *Agassiz Agonistes* covers Agassiz's attempts to demonstrate the inferiority of African and Native Brazilian peoples. This is a particularly disturbing section, an account of using natural history and collections to support racist ideology through Anglo-Saxon exceptionalism. In 1850, Agassiz declared that people of different skin color "did not originate from a common centre, nor from a single pair" [p. 281], although he never could account for the existence of children of parents belonging to different races. This seems at once to fly in the face of Christian beliefs in special creation, including man and woman, but it was a not uncommon belief in that era. Ironically, Agassiz opposed slavery even though different races were of different species in his opinion. Instead, he thought freedom would actually encourage geographical separation of the races. He virulently opposed miscegenation, and thought that the mingling of the races in Brazil only led to the degradation of both white and native populations. To support his preconceived ideas, Agassiz had photographs (often nude and of young women) taken to illustrate the differences of the "inferior" races with those of the ideal white European (naturally, he did not have photos taken of young white women). Irmscher concludes his narrative with a quote from William James [p. 291] that Agassiz "had looked on the world as if it and he were made for each other, and on the vast diversity of living things as if he were there with authority to take mental possession of them all." Note the emphasis on possession rather than understanding, something I think Holbrook and other naturalists would have abhorred. Agassiz died "sad and intellectually isolated" [p. 291] as natural history evolved into the science it is today.

The book concludes with extensive notes (pp. 293–344—I liked the way the headings of the notes section corresponded with the text making checking notes very easy), a selected bibliography (priceless for its references to early herpetological references), and a very helpful index. The book is well illustrated throughout with 64 excellent photos, and meticulously referenced covering the subjects of the chapters and prior literary criticism of the naturalists' textual and visual contributions. Herpetologists and other naturalists interested in the history of their subject will want this book for the wealth of information it contains on perspectives of collecting and natural history in pre-Darwinian America, despite the sometimes over-the-top literary jargon and the author's frequent exuberant use of anthropocentric adjectives and verbs. The book presents a most interesting history and literary analysis.

Acknowledgments

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References

Adler, K. 2004. America's first herpetological expedition: William Bartram's travels in the southeastern United States (1773–1776). *Bonner zoologische Beiträge* 52:275–295.

Agassiz, L. 1872. [Eulogy for Dr. J.E. Holbrook]. *Proceedings of the Boston Society of Natural History*, 14:347–351.

Barton, B.S. 1796. *A Memoir Concerning the Fascinating Faculty Which Has Been Ascribed to the Rattlesnake, and Other American Serpents*. Henry Sweitzer, Philadelphia. 70 p.

Hallock, T., and R. Franz (eds.). 2017. *Travels on the St. Johns River*. John Bartram and William Bartram. University Press of Florida, Gainesville. ix, 223 p.

Harper, F. (ed.). 1958. *The Travels of William Bartram. Naturalist's Edition*. Reprinted 1998. University of Georgia Press, Athens. lxi, 727 p.

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Bibliotheca Herpetologica

Six Reasons Why (and How) You Should Digitize Your Herp Library

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Practically all scientific literature is now published in digital formats online. However, the historical literature remains critical especially in biology, ranging from taxonomy to biogeography, and natural history. Hence it was a landmark decision to digitize much of the older literature by the Biodiversity Heritage Library (BHL) project starting in 2006. BHL is complemented by other similar projects, such as Google Books, the Internet Archive, and many national library projects, e.g., Gallica in France, the AnimalBase project at the University of Göttingen, Germany, and many others (Table 1).

Most of these projects primarily focus on the historical literature which is either out of copyright or of little commercial value, so that publishers are willing to make it available online. Google Books is an exception in that it provides bits and pieces of new books and links to book sellers for complete digital or print versions.

The situation is different for newer scientific literature, which is still commercially very successful, at least for scientific journals that are required by active scientists. Despite or rather because of large profit margins in scientific publishing, the trend is going towards open access publishing. No matter what—someone has to pay for it, whether it is the authors, scientific societies and their members, or the general public. However, cost is only one reason why publishing is becoming increasingly digitized. Digital publications have many other advantages, and even individual users should consider going digital with their private libraries.

Why You Should Digitize Your Own Library

Scientists love books and biologists who value the historical literature love them even more so. However, with much of the literature becoming available online, users may have fewer reasons to digitize their own literature but there are still good reasons to do so:

1. **Space**. Books and printed journals need space—lots of it if you have a decent library. That may not be a problem if you have a house or large apartment, but many of us do not have this luxury. By contrast, you can put a bookshelf worth of books and journals on a micro-SD card smaller than the size of your finger nail—even if that card doesn't look as impressive as your bookshelf (and may not be as easily accessible).
2. **Searchability**: Once you have papers and books in a digital format, you can easily search them. In fact, you can search whole libraries in seconds. You can even search scanned papers if you use optical character recognition (OCR). Modern operating systems have built in indexing, so you can simply search your hard drive (or specific journal folder if you have any) for keywords or combinations thereof. Even good indices of (printed) journals won't allow you to do that, especially since indices are typically produced for individual volumes (e.g. by year).
3. **Portability**. I still have bookshelves full of books and journals in my native Germany that I never managed to move to the US where I live and work today. Once digitized, you can take your books and papers anywhere on your mobile device and read them on such devices. Obviously, you could put your literature on cloud storage to make it more easily accessible from anywhere, but that would require an internet connection. Reading a paper on a phone may be a real pain, but I read many papers now on an iPad, which has a convenient size. That also allows me to annotate and highlight while reading.
4. **Shareability**. With fast internet connections, it's easy to share even large books or papers by email or cloud sharing. While this may be illegal for many publications, it shouldn't stop you from making full use of your legal options (e.g. by sharing your own papers, theses, or out-of-copyright publications etc.).
5. **Cost**. Providing space for lots of books costs money, both for storage space and transportation if you need to move. It also costs money to print and ship books and journals. In fact, printing and shipping have been the biggest cost factor for a lot of publishers, including ISHBH.
6. **Sustainability**. Paper is dead wood. You have to cut trees to produce it and most literature is dead wood cubed: most literature is hardly used and thus wasted; production and transportation of paper causes deforestation, unnecessary energy usage, and pollution.

Obviously, there are **downsides to digitization** too: you need machines and electricity to read digital documents and not everybody likes to read on a screen. Finally, nobody knows how to maintain reliable digital storage over centuries.

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Table 1. Selected online sources for historical and recent herpetological literature. Except for the Reptile Database and Wikiherps, all sites provide general (biological) literature, hence it is impossible to estimate their number of herpetological publications. The Reptile Database literature database contains >52,000 references of which >41,000 have URLs.

Source	URL
AnimalBase	http://animalbase.org/
Biodiversity Heritage Library	https://www.biodiversitylibrary.org/
BioOne	http://www.bioone.org/
Gallica	https://gallica.bnf.fr/
Google Books	https://books.google.com/
Hathitrust	https://www.hathitrust.org/
Internet Archive	https://archive.org/
JSTOR	https://www.jstor.org/
Reptile Database	http://www.reptile-database.org/
Researchgate	https://www.researchgate.net/
Wikiherps	https://www.facebook.com/groups/1610769885876942

Fig. 1. Essential equipment for efficient paper scanning. (Left to right) Staple remover, paper cutter to turn bound papers and journals into single sheets, and a scanner with sheet-feeder for batch scanning (ideally with built-in OCR), here: Fujitsu Snapscan. Many models also allow double-sided scanning.

Cutting up journals is the most time-consuming part. Scanning itself is quick and easy, although some types of paper may cause sheet-feeder errors (such as paper jams caused by glossy paper). Many years ago, I scanned hundreds of reprints (thousands of pages), but that is, luckily, a thing of the past with most papers now becoming available as PDFs (although amazingly, there are still some journals which do not distribute PDFs, although, ironically, they may send PDFs as proofs to their authors).

How to Scan Journals and Reprints

Before you scan in your papers, check the sites in Table 1 (or Google) for online PDFs. A proper PDF (as opposed to a scan) avoids several major problems: it should be computer-readable as is, takes less time to get, and it uses up much less space than a scanned version. In addition, you don't have to damage or destroy your valuable originals while scanning.

Scanning large numbers of papers is easy if you can get them as individual sheets of papers, so you can simply feed them into a scanner with a sheet feeder (Fig. 1). Articles are hardly ever printed on individual sheets of papers, so you have to take them apart in almost all cases (Fig. 1). It took me a long time to make the decision to cut several of my journal collections into single sheets for scanning. It's heart-breaking. But the advantages outweighed the disadvantages. For instance, within a few days I scanned about 15 years of the German journal *Elaphe* (~6000 pages) and then another 15 years of the German and European "*Reptilia*" (~10,000 pages). These are some of the journals that were never made available online, so there was literally no option to get them in digital format.

How to Scan Books

Even though I do buy printed books, I still try to scan them. Understandably, I cannot bring myself to take apart books the same way I have dissected journal issues, so the only feasible way to scan them is to use a flatbed scanner or photocopier. That is obviously a pain in the neck, but I use two strategies to make it bearable. First, I scan during downtimes when I am hardly able to do anything else that requires much focus. While scanning I listen to podcasts, so it's not too boring. Alternatively, I simply delegate the job to someone else. Besides hiring students, I have hired several homeless people or panhandlers on the street. No kidding. Whenever people ask me for change I give them my business card and offer them a job for a few hours. Three or 4 people have actually shown up and scanned a couple dozen books that way.

It's critical that your scanner either provides an OCR function or you can do OCR after scanning, so you can make your books searchable. Most scanners offer built-in OCR features. Alternatively, you can use OCR software such as that built into Adobe Acrobat or more specialized programs.

Your choice of scanner does make a difference too. Recently, we got a new scanner in our department office, the Canon Imagerunner 3530i. Amazingly, this scanner is much worse that its old predecessor in many ways and thus nicely shows what you need to pay attention to: the new Canon scanner has a fairly awkward user interface. It doesn't even have a proper ruler on its surface: while you can select custom sizes on the display, it doesn't help you because you cannot measure the size of your books. Moreover, while you can scan a book to a flash drive, that requires a password. Weirdly, you don't need a password to scan to email. However, since scanned books tend to become large files, the Imagerunner will split your book into segments of 8 pages each and a correspondingly large number of emails. The older model didn't have any of these issues. You can probably change some of these features, but it's not obvious how to do it.

Dedicated book scanners are often a better choice than copier scanners or even flatbed scanners (Fig. 2). They are available in many libraries. However, their quality is often not as good as a flatbed scanner although they are much easier and faster to use.

You can get the convenience and quality of a professional book scanner if you have a good camera and a tripod (Fig. 3). I have scanned many books and papers using such a setup. Ideally the camera should have Wi-Fi or Bluetooth capabilities, so you can remotely control the camera by a smart phone while flipping pages of a book. The downside is that you will get single photos instead of PDFs. While you can convert them to PDFs, it requires quite a bit of processing, so I usually don't bother. Let me know if you are aware of any way to automate this process.

Some (Mixed) Personal Experiences with eBooks

Although I love printed books and enjoy flipping through their pages, I often prefer to buy ebooks for the aforementioned reasons. However, that can be a mixed blessing as the following three examples show.

When I bought the ebook version of Chan-ard's *Reptiles of Thailand* (on the Google Play Store) the quality was so miserable that I got the same book from a library afterwards and scanned it *again* myself. Even worse, the Google eBook was only available online, so whenever I was offline I couldn't use it.

When I tried to buy the eBook version of *Reptiles & Amphibians of New* Zealand by Van Winkel et al. (2018), the publisher's website told me that the book "is not available in your country". Seriously? I do not find it very appealing to buy a book whose *shipping* may cost more than the whole book.

Finally, shortly after I bought the print version of Van Wallach's *Snakes of the World*, someone sent me a PDF of the book (which, at the time, was not even available for purchase on the publisher's website, which only offered an eBook in a proprietary format that required a special application). While the PDF was welcome, it turned out that its pagination was different from the print book (the taxonomic parts starts on different pages, namely page 2 in the print vs. page 3 in the PDF, with increasingly divergent page numbers in subsequent chapters). What was going on here? It turns out that the PDF has blank pages inserted between each chapter while the print version doesn't, so that page numbers may differ by 20 pages towards the end of the book. When I asked Van about this, he didn't even know about it.

Digitization and Copyright

The reluctance of publishers as well as authors to release ebooks and especially PDFs is not surprising. Scanned books and PDFs can easily be exchanged over fast and cheap Internet connections. However, the downsides of print books are manyfold, especially when they have small print runs and thus become ever-more expensive. Some publishers already personalize ebook PDFs with individual information, such as clearly visible customer name, email address, or (parts of) a credit card number. While this is unlikely to stop illegal copying and distribution of book, it will certainly reduce it. In contrast to PDFs, proprietary formats have many disadvantages that make them much less useful, especially if they prevent indexing outside those apps or copying and pasting of selected content.

Fig. 2. Bookscanners (here: IRIS Iriscan Desk 5) are available in many libraries. They are much faster and more convenient than flatbed scanners but may not provide the same resolution as the latter.

Modern copyright, as codified by the *Berne Convention*, usually protects creative works 50 years beyond an author's death, although that seems overly protective. Some have argued that scientific works should not be copyright-protected at all, because they are rarely "creative" in an "artistic" sense (e.g. Agosti & Egloff 2014). This is a complicated topic and with its broad implications unfortunately beyond the scope of this article.

Sharing Your Digital Library

While we all should respect the law and the interest of publishers and authors, there are legitimate reasons to share literature, e. g. with a collaborator for a specific project. That may still be technically illegal but could be considered as fair use, especially if your collaborator agrees not to further distribute the material. File sharing technologies, even for large files (e.g. over Google Drive, Dropbox, or WeTransfer) make this technically easy. If you are looking for certain hard-to-find papers, Wikiherps and other Facebook pages have become commonly used platforms to track down and obtain such publications (Table 1). You can and should share your own papers, of course, on your own website or platforms such as Researchgate, which is permitted by many (but not all) publishers.

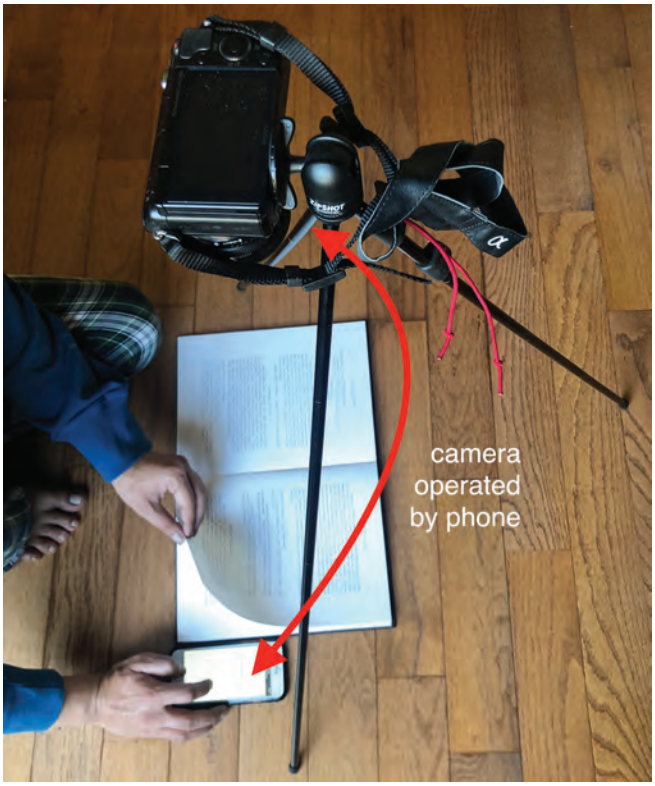

Fig. 3. Do it yourself scanner. A digital camera on a tripod operated by a phone (via Bluetooth or Wi-Fi) allows you to flip pages and taking pictures rapidly and at high quality.

Organizing PDF Collections

If you have thousands of PDFs, as many people now do, the challenge becomes to organize them. The easiest solution is to use one of the free or commercial reference managers, such as Mendeley (free) or Endnote (commercial). They usually allow you to simply dump your PDF onto them and extract the bibliographic metadata right from the paper—at least for the more recent papers that contain this information. For older ones you have to enter that information—or rather copy it from the paper or its webpage (there is usually a link for citation data).

My bibliographic database lives in a Filemaker file which is somewhat unorthodox, but it allows me to connect it to numerous other databases, such as the Reptile Database, our image database, or the NCBI taxonomy database online.

For your actual papers, you can keep all those PDFs in a folder on your computer for easy access (which some reference managers allow you to open by simply clicking that reference in a list).

I essentially collect all PDFs in a single folder and name them in a standard way by author, year and title key word (e.g. "Liu 2020 *Acanthosaura* Yunnan.PDF", so I can find them easily without the need to open a reference manager (e.g., it takes me no more than 3 or 4 seconds to find a paper by activating search on my Mac by pressing command-space and typing, e.g., "Liu 2020").

Outlook: Remaining Problems and Solutions

With more than 2 million scientific papers published each year it becomes practically impossible to follow even the literature in your own area of research. Even if all literature were available online (or locally in digital format) this would not solve the biggest problem of the scientific literature today: scientific publishing is still based on a 16th century model of information dissemination: in many ways it does not make a big difference if you have a paper on paper or as a PDF—it is still a (static) paper. Furthermore, you have to read it to access its information and it won't change even if the information changes. In the long run, we will need better solutions for an old problem: making information accessible while it constantly changes (Khan et al. 2014).

Information access is better dealt with by electronic databases that you can query for specific pieces of information. More importantly, databases allow you to search for combinations of data or even computed datasets. For example, if you want to learn about the food web in nature, thousands of papers that report diets or individual prey-predator relationships won't help you. You would need a database of such information, ideally with tools to access and process specific subsets (e.g., which snake family eats which prey in which geographic area). Hence it becomes increasingly important to make publications accessible through data curation into structured databases or even make curation automatically possible by computerized text mining. There is still a long way to go, but eventually we will get there.

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References

Chan-ard, T., Parr, J.W.K. & Nabhitabhata, J. 2015. *A field guide to the reptiles of Thailand*. Oxford University Press, NY, 352 p.

Egloff, W., Patterson, D.J., Agosti, D. & Hagedorn, G. 2014. Open exchange of scientific knowledge and European copyright: The case of biodiversity information. *ZooKeys* 414: 109–135.

Khan, R., Goodman, L. & Mittelman, D. 2014. Dragging scientific publishing into the 21st century. *Genome Biology* 15:556.

Liu, S., Hou, M., Mo, M., Rao, D. (2020) A new species of the genus *Acanthosaura* (Squamata, Agamidae) from Yunnan, China, with comments on its conservation status. *ZooKeys* 959: 113–135.

van Winkel, D., Baling, M. & Hitchmough, R. 2018. *Reptiles and Amphibians of New Zealand: A field guide*. Auckland University Press, Auckland, viii, 366 p.

Wallach, V., Williams, K.L. & Boundy, J. 2014. *Snakes of the World: A Catalogue of Living and Extinct Species*. Taylor and Francis, CRC Press, 1237 pp.

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Tewaquaptewa, Trailfinders, and Turtles—The Unexpected Origins of Western Pond Turtle Shells in the Hopi Snake Dance

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According to some scholars, turtles—really, reptiles in general—were considered either unclean or poisonous among many of California's Native Americans (Kroeber 1976). Because of this anathema, the Western Pond Turtle (*Actinemys marmorata*) only appears sporadically in the archaeological record as a ceremonial or a subsistence item of select California Native American groups. The Western Pond Turtle is one of two fresh-water turtles native throughout the North American Pacific Coast west of the Sierra-Cascade divide between Canada and Baja California and, for all intents and purposes, the only fresh-water turtle native to California. By these measures, Western Pond Turtle specimens found beyond their natural range present examples worth scrutinizing further. Such is the case with two heretofore overlooked instances where Western Pond Turtle shells were specifically sought out by Native American Hopi chiefs in the Oraibi and Walpi pueblos in Arizona. By examining these rare occasions when the Western Pond Turtle does appear in the archaeological record together with more contemporary accounts, the Western Pond Turtle's importance to Native Americans in the western United States gains new perspective.

El-la-chick: A Subsistence Item

The Western Pond Turtle went by many names among California's Native American tribes. The Waksachi Yokuts-Western Mono referred to them as "a ´ñya," the Chunut and Tachi Yokuts as "tu ´ñkɔt" (Gayton 1948), and the Pomo as "xûwî´lin" (Barrett 1952). However, it was the western Washington state Nisqually tribe's "El-la-chick" (Cooper 1859) that became Anglicized and eventually synonymous with the Native American term for the Western Pond Turtle overall at the turn of the 20th century (Webster's Revised Unabridged Dictionary 1913).

Throughout the west coast, the site that likely experienced the greatest subsistence gathering of Western Pond Turtles—and not coincidentally, the same site where Western Pond Turtles have been estimated to occur historically in the millions (Holland 1989)—is Tulare Lake, located in California's southern San Joaquin Valley in San Joaquin and Kings counties. By some accounts, it would appear that for the local Yokuts Indians, collecting Western Pond Turtles in Tulare Lake was like shooting fish in a barrel.

> [Yokut] women would wade in, fifteen and twenty abreast, treading for a mile and more. All the while feeling with their toes as they scoured the lake bottom for clams, mussels and terrapin. It took no time to fill the conical baskets slung across their backs (Arax 2003).

It is therefore surprising that Western Pond Turtles escaped mention in the post-1900 anthropological accounts of Thomas Jefferson Mayfield, who was adopted and raised by the Choinumne Yokuts Indians at age six (Mayfield 1993), and were only mentioned off-hand in anthropologist and oral historian Frank Forrest Latta's meticulously researched *Handbook of Yokuts Indians*, which was based in part on interviews with Mayfield (Latta 1949).

Based on faunal remains recovered from Creighton Ranch, an "Indian Mound" archaeological site located along the former eastern shoreline of Tulare Lake, 33 wildlife species have been identified as probable food sources for the Southern San Joaquin Valley Yokuts. Included in this list are three reptile species: Pacific Gopher Snake (*Pituophis catenifer catenifer*), Pacific Rattlesnake (*Crotalus oreganus*), and Western Pond Turtle. During excavations in the summer of 1989, 616 Western Pond Turtle bone fragments were recovered from the Creighton Ranch site, deposited in such a way as to suggest Western Pond Turtles were consumed on a regular basis by the Yokuts throughout their occupation of the area dating back to the Late Pleistocene. Furthermore, Western Pond Turtles ranked high as a primary food source together with lake fish (Sacramento Sucker, Sacramento Squawfish, Sacramento Perch, Tule Perch) and freshwater mussels, surpassing large (Tule Elk, Blacktail/Mule Deer, Bighorn Sheep), medium (Coyote, Raccoon, Long-tailed Weasel, Blacktailed/Audubon's Cottontail Rabbit) and small mammals (Beechey Ground Squirrel, Botta's Pocket Gopher, San Joaquin Kangaroo Rat, Meadow Vole) in importance (Dillon et al. 1991).

Creighton Ranch archaeologists speculate that the Western Pond Turtle could have been procured through any number of "turtling" methods: harpooned with hardened wood or bone tipped spears, disabled with thrown sticks or rocks (the latter reportedly scarce in the region), taken by hand using cordage and bait, driven or chummed into baskets and weirs, or stupefied with turtle poison (Dillon and Porcasi 1990).

Anthropologist Anna Hadwick Gayton reported that the

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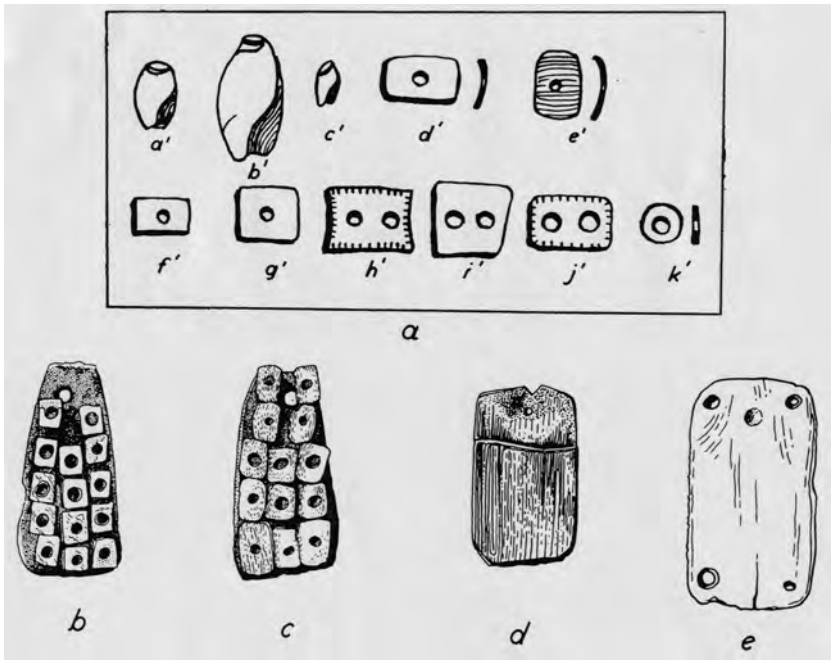


Fig. 1. Shell beads (a) typical of the turtle-carapace pendants found in grave pits associated with the Blossom and Phelps settlements along the Mokelumne River were worked from the marine olive shell snail (*Olivella* sp.) and abalone (*Haliotis* sp.), then affixed to perforated, trapezoidal turtle carapace bones (b) and (c) with asphaltum. Other undecorated pendants recovered from the site were instead rectangular in shape. The rectangular shell beads on pendant (b) are that of *Haliotis*

Chunut and Tachi Yokuts of the Lake Tulare region prepared their turtles as followed:

> They were stabbed under the throat with a sharp stick, put on hot coals, and roasted; then the shell was broken off and the larger entrails were discarded (Gayton 1948).

The archaeological evidence at Creighton Ranch substantiates Gatyon's description. Although some turtle bone remains recovered from the site show evidence of butchering, all of the fragments were shattered (presumably, to expose the flesh) and most had been burned (Dillon and Porcasi 1990).

The relative abundance of Western Pond Turtle remains led Dillon and Porcasi to reflect on the apparent disconnect between the archaeological and ethnographic records:

> [The Western Pond Turtle] passes virtually unnoticed in most ethnographic reporting on the Yokuts… "Turtle" also appears nowhere either as a Yokuts totem animal or clan or family name. This is not surprising in the context of turtle's disreputable status in what may be his sole appearance in Yokuts Mythology, where a Yauelmani account associates turtle with flatulence and artificial anal closure… In seeming contradiction to the Western Pond Turtle's ethnographic near-invisibility however, is its recent discovery in some abundance at a newly-excavated archaeological site at Lake Tulare [Creighton Ranch]. This is significant as a caution against too-ready acceptance of ethnographic reporting as an all-encompassing representation of the prehistoric situation, and underlies the necessity of keeping ethnographic and archaeological data separate but complementary (Dillon and Porcasi 1990).

Such "turtling" has been reported among the Clear Lake Pomo in Lake County, California, as well. There, ethnologist Samuel Alfred Barrett's Pomo informants relayed to him details of how Western Pond Turtles were caught and used as food:

> About Clear Lake the turtles came out to sun themselves at certain places on the flattened-down stems along the strip of tule which fringes the shore. A net was placed just under the surface of the water at such a point. Later, when several turtles had congregated, they were suddenly startled and caused to dive. In their endeavors to escape they became entangled in the net.
>
> A turtle may be placed directly in the fire. As soon as the shell cracks open, the meat is taken out and placed on the coals to broil. In another method the turtle is placed in the hot ashes to bake. This is a much slower process but when the baking is completed the shell is cracked open and the meat is ready to eat (Barrett 1952).

Anthropologist Edwin Meyer Loeb described a second "turtling" technique employed by the Pomo using basket traps like the double fish trap (Loeb 1926). These consisted of two conical baskets—the innermost with an opening in it's belly—woven from slender willow stems, nested and bound together along their rims. A permanent gap of eight to ten inches was left in place along the joined rims and was sealed by a temporary binding of willow stems (Barrett 1908).

At Clear Lake, these basket traps were simply weighted with stones and placed under water (Loeb 1926). Traditionally, however, such fish baskets were set along brush weirs that spanned a stream, relying on the concept that fish and turtles that swam through the small opening would be unable to find their way out again. When it came time to empty the trap's contents, the temporary binding was cut and the trap upturned, allowing fish and turtles to fall through the gap along the rim (Barrett 1908).

Although the principle is sound, Barrett's Pomo informants were skeptical that the fish baskets Loeb described would be effective since the mouth of the trap would prohibit any but the smallest of turtles from entering the trap (Barrett 1952).

Western Pond Turtle eggs, too, were part of the Pomo diet; fresh turtle, quail, goose, and duck eggs were prepared wrapped in grass and baked in ashes (Loeb 1926).

Despite these few examples, Dillon and Porcasi caution that the bulk of ethnographic reporting does not weigh West-

ern Pond Turtle as an important food source to Native American groups in general, which suggests to them that the Yokuts' Creighton Ranch site reflects a "specialized exploitation [of Western Pond Turtle] perhaps unique to Lake Tulare, and one not likely to be duplicated at sites outside the Sacramento and San Joaquin Valleys" (Dillon and Porcasi 1990).

Beads and Bones and Turtle Stones

While it is usually assumed that chelonian remains are related to subsistence activities, there are several ways in which turtle and tortoise remains can turn up in the archaeological record, such as shells modified into artifacts like bowls, cups, or turtle shell rattles. However, without clear signs of butchering or burning, it can be hard to distinguish between food and non-food uses (Gillreath-Brown and Peres 2017).

Native American groups in the southwestern United States used Desert Tortoise (*Gopherus* spp.) shells and bones in all sorts of ways. In addition to turning them into ceremonial rattles, carapaces were also repurposed as bowls, ladles, containers, spoons, soil scoops, and smoothing tools. The shell could also be ground into powder as a medicine to treat stomach and urinary tract afflictions. Bones were strung into ornamental necklaces or used as ritual divining pieces (Schneider 1996).

Fig. 2. Philadelphia artist Peter Moran sketched the Hopi snake priests after witnessing a Snake Dance circa 1881. The sketch includes a detail of the turtle-shell rattles. Peter Moran. "The Snake Dance, Walpi, Arizona" from Udall 1992, p. 25. Courtesy Permanent Collection of the Roswell Museum and Art Center, Roswell, NM.

Recognizing that chelonian shells and bones provided so many possible uses, it stands to reason that Western Pond Turtle remains might have been used in a similar fashion. For example, the Western Pond Turtle's shell appears on occasion in the archaeological record as a ceremonial item, most frequently in the form of a rattle. At the Falcon Hill archaeological site, located in the Winnemucca Lake Basin of western Nevada, 19 Western Pond Turtle plastron and carapace fragments from at least eight individual turtles dating to about 3750 BP were recovered from Kramer Cave (26Wa196), a small hillside chamber thought to have been used for ceremonial practices or storage. Sixteen of the fragments had been modified by polishing, perforation, or shaping into ornaments or other artifacts. The remaining fragments may have been culinary remains or chaff from the ornament manufacturing process (Hattori 1982).

In grave pits associated with the Blossom and Phelps settlements along the Mokelumne River in Northern California, turtle carapace pendants were unearthed with an age dating to roughly 3000 BP (Fig. 1). Several of these pendants were undecorated and rectangular; others were decorated with rectangular shell beads worked from the marine olive shell snail (*Olivella* sp.) and abalone (*Haliotis* sp.) and affixed to perforated, trapezoidal turtle carapace bones, presumably Western Pond Turtle (based on biogeography alone; see discussion below), with asphaltum (a tar-like oil collected for use as a caulking agent), an adhesive later replaced by fish glue or plant gum (Heizer 1949).

In other cases, however, it is often unclear whether the Western Pond Turtle was a subsistence item or merely used ceremonially. In the southwestern Great Basin/Mojave Desert in Southern California, both Western Pond Turtle and Desert Tortoise (*Gopherus agassizii*) remains have been recovered from archaeological sites along the Mojave River at Oro Grande and Afton Canyon dating as far back as 9470 BP. Some remains consisted of shell fragments that were burned or marked in such a way as to suggest they had undergone cooking in preparation for consumption. Other remains were drilled and bore traces of asphaltum, which suggests to anthropologists that the shells might have been used as ceremonial rattles (Schneider and Everson 1989).

In 1946, an excavation for a residential swimming pool in Concord, California, exposed an archeological burial site containing the remains of nine humans. Among the artifacts buried with them were turtle bones dating to roughly 500 BP (Bohakel 1977), presumably those of the Western Pond Turtle

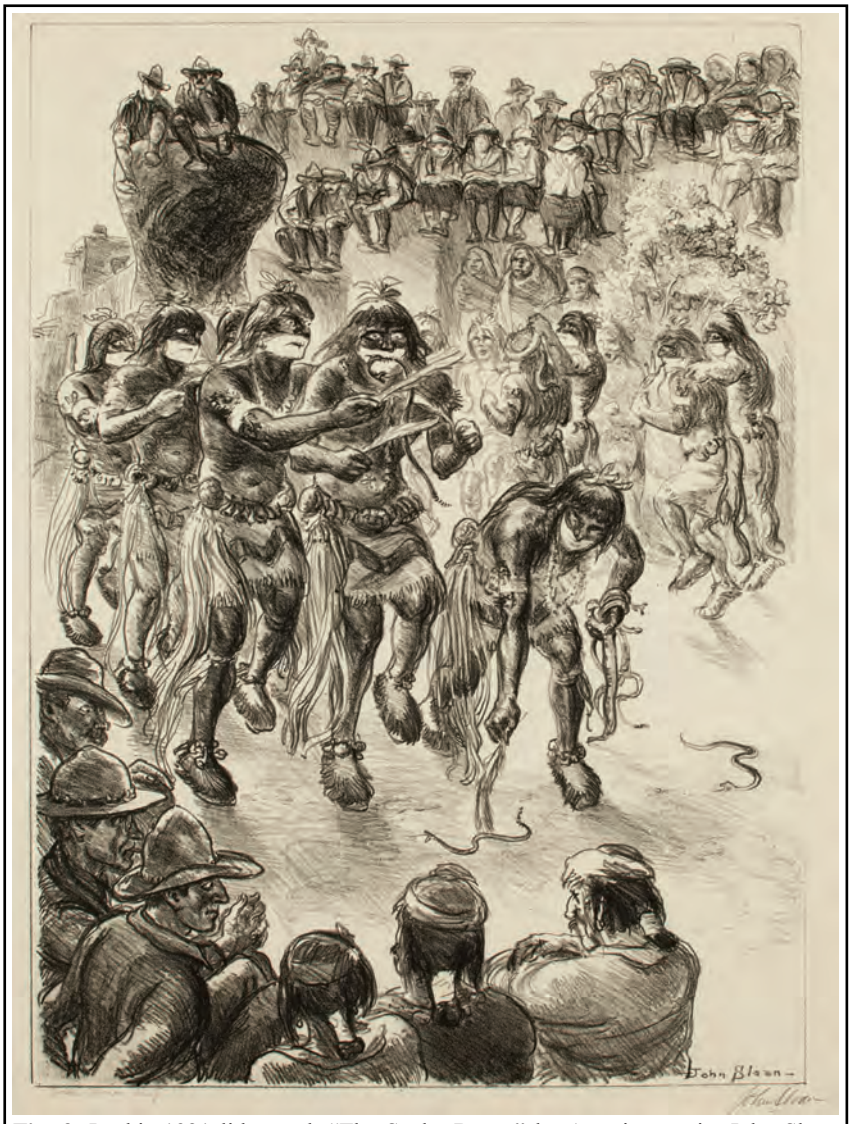


Fig. 3. In this 1921 lithograph "The Snake Dance" by American artist John Sloan (1871-1951), the Hopi snake priests perform the ritual Snake Dance to a crowd of onlookers. Visible at the priests' waists are turtle rattles. Courtesy of the Kraushaar Galleries, New York (www.kraushaargalleries.com/).

(based on biogeography alone; see discussion below). In San Jose, California, an "important prehistoric ancestral Ohlone village with over 124 human burials" yielded faunal remains with an age dating to between 800 and 1200 AD, among them the fragments of Western Pond Turtles (Hylkema 1994). Other coastal California archeological sites in Ventura County, Long Beach, Santa Barbara County, and the Channel Islands have also yielded Western Pond Turtle remains (Schneider and Everson 1989). On San Miguel Island, for example, a rattle comprised of two separate Western Pond Turtle carapaces was found in a burial site (Heye 1921).

In the Pacific Northwest, anthropology professor Jacob L. Fisher has been investigating the apparent dearth of Western Pond Turtle remains in Washington state's archaeological record and its conspicuous absence throughout the ethnographic literature, oral tradition, and imagery of the Puget Sound region's Native Americans. The sole ethnographic evidence of Western Pond Turtle in the Puget Sound region can be attributed to the Nisqually Indians. The Nisqually reportedly gathered turtle eggs at Nisqually Lake, which the Nisqually called "*yicáxtcabc*," or "place where the turtles come from" (Hays et al. 1999).

Fisher's review of Puget Sound's archaeological records has turned up four sites with turtle remains, only two of which have been identified as Western Pond Turtle with lingering uncertainty (based on biogeography alone; see discussion below). The first specimen, a single plastron fragment found on the north end of Whidbey Island at Cornet Bay dating from roughly 2500 BP, may just as well have been the remains of the locally common Painted Turtle (*Chrysemys picta*). The identity of a second specimen, found on the Kitsap Peninsula at the Bay Street Shell Midden, dates between 1150 and 1750 AD, and is just as uncertain (Fisher 2018).

A unique example of Western Pond Turtle in the lithic record can be found in the form of a stone effigy excavated from a rock shelter known as Rattlesnake Cave in coastal Orange County, California (CA-ORA-269). The carving, which dates between 1500 and 1800 AD, consists of a streamworn, naturally rounded siltstone cobble split in two from a blow to what would be the plastral rear marginal scutes on an actual turtle shell. Around the circumference of the stone, the artisan incised a pattern of repeating triangles and diamonds to mimic a turtle's marginal scutes. Similar, more haphazard markings can be found on the upper carapace and plastral under surfaces. Signs of wear and polishing suggest the effigy may have doubled as a tool to scrape or soften hides, a dual purpose that makes the artifact all the more unusual (Strudwick and Koerper 2006).

Several factors may explain why the archaeological record has overlooked Western Pond Turtles and, more generally, herpetofauna. In several of the instances described above, the identity of chelonian remains were generally *assumed* to be those of the Western Pond Turtle. According to Fisher, zooarchaeologists aren't specifically trained to identify reptile and amphibian remains. As a result, the methodology of archaeologists and zooarchaeologists has tended toward lumping unidentifiable or unrecognizable herpetofauna specimens under catchall categories such as "undetermined/other" (Fisher 2018, Schneider and Everson 1989) or, in the rare cases where turtle remains can be identified, they're nonspecifically labeled "turtle" or "Testudinidae" (Fisher 2018,

Schneider and Everson 1989). Worse yet, sometimes specimens are identified through a species' biogeography by simply deferring to a field guide's range map rather than relying on skeletal characteristics (Fisher 2018), a practice that extends into paleontology as well (see Bell et al. 2009). This lazy methodology is not only problematic but counterproductive due to its circularity (Bell et al. 2009, Fisher 2018).

Tewaquaptewa and the Trailfinders

Outside of California, turtle shells in general appear more frequently in the archaeological record. In Arizona, for example, the Native American Hopi Tribe of northeastern Arizona frequently used rattles crafted from turtle shells in their Snake Dance. Of course, there were ample native turtles to chose from, including three mud turtles (*Kinosternon arizonense*, *K. flavescens*, *K. sonoriense*), one Box Turtle (*Terrapene ornata*), the Desert Tortoise (*Gopherus agassizii* and *G. morafkai*) (McGinnis and Stebbins 2018), and the Painted Turtle (*Chrysemys picta*) (Lovich et al. 2014). However, in their summary of turtle hunts organized by the Hopi specifically for the purpose of collecting turtle shells for rattles, Lovich et al. (2014) note that the hunting expeditions appear to have targeted Clear Creek (aka East Clear Creek), a tributary of the Little Colorado River in Arizona, where Painted Turtles were once abundant. With so many species to choose from, the surprising appearance of Western Pond Turtle shells in 1932 (Bogert 1933) procured 250+ miles east of their natural range is an outlier worth exploring.

Fig. 4. In this April 1935 Standard Oil Bulletin pamphlet cover, American artist Maynard Dixon (1875–1946), famed for his portrayals of the American West, created this striking portrayal of the Hopi Snake Dance. Visible behind the snake priests' knees are turtle rattles. Courtesy Mark Sublette Medicine Man Gallery and Maynard Dixon Museum, Tucson, AZ.

The Snake Dance, whose origins among the Hopi is believed to predate Spanish contact, was a dramatic ritual dance performed by Antelope and Snake Priests (Bogert 1933, Udall 1992) as part of a larger ritual, the Snake-Antelope ceremony (*Chu'tiva*), to elicit rain and fertility for fields of corn, beans, and squash. Anthropologist J. Walter Fewkes described the Snake Dance as "an elaborate prayer for rain, in which the reptiles [snakes] are gathered from the fields, intrusted [sic] with the prayers of the people, and then given their liberty to bear these petitions to the divinities who can bring the blessing of copious rains to the parched and arid farms of the Hopi" (Fewkes 1894).

The Snake-Antelope ceremony takes place every other year, with the Snake Dance itself occurring on the sixteenth day. In brief, the Snake Dance can be described as follows. After several days of preparation leading up to the ritual dance, on the twelfth day young men from the village would travel to the north, south, east, and west in search of snakes (venomous and non-venomous), which were collected and deposited alive in the Snake Kiva in earthenware jars. On the fifteenth day and sixteenth day, the Antelope Race and Snake Race took place respectively, each concluding with their respective dances. The Antelope runners and Antelope Dance

Fig. 5. This 1897 photograph of Hopi snake priests reveals between the folds of their ceremonial kilts and pelts several turtle rattles fastened in place behind the priests' knees. James, George Wharton. California Historical Society and University of Southern California Libraries, California Historical Society Collection, 1860–1960.

emulate the sound of thunder, bringing forth the clouds, while the Snake runners and Snake Dance draw rain from the clouds (Bourke 1884, Mendelieff 1887, Waters 1977, Hovens et al. 2004).

On the morning of the Snake Dance on the sixteenth day, the snakes were then relocated from the kiva to a "kísi," a wooden shelter or shade hut in the court where the Snake Dance would take place. During the ceremony itself, first the Antelope Priests, and then the Snake Priests, whose raiment included a turtle or tortoise rattle tied behind their right knee, filed into a courtyard while sacred corn meal was scattered on the ground. After a ritual of chants, the Snake Priests would pair off—one with a snake between his lips, the second with a feather wand to draw the snake's attention as the priests performed their dance. One by one, the priests would release their hold on the snake, letting it drop to the ground to be collected by boys or men who would hand the snakes to the Antelope Priests. Meanwhile, the Snake Priest pairs would return to the kísi for a new snake. When the supply of snakes ran out, and the snakes had all been collected, anyone holding a snake would rush to place them inside a large circle of cornmeal on the ground. From this writhing mass of snakes, the Snake Priests returned to collect as many snakes as they could hold, which they carried away to be released at the base of the mesa. Upon their release, it was thought that the snakes would seek out the spirits of the underworld and communicate the village's need for life-giving rain (Bourke 1884, Mendelieff 1887, Waters 1977, Hovens et al. 2004).

Details of such turtle-shell rattles can be seen in an 1881 sketch by Philadelphia artist Peter Moran (Fig. 2), as well as in the 1921 lithograph "The Snake Dance" by American artist John Sloan (Fig. 3) and on the cover of the April 1935 *Standard Oil Bulletin* pamphlet by famed American artist Maynard Dixon (Fig. 4). An 1897 photograph by George Wharton James clearly shows several turtle rattles fastened in place behind the knees of the Hopi snake priests of the Walpi pueblo (Fig. 5), while an 1887 article in *The Swiss Cross*, "a monthly magazine of popular science," featured a full-page diagram illustrating among other ceremonial paraphernalia a "tortoise-shell rattle" and rattlesnake (Fig. 6). Because it is not uncommon for the layperson to use "turtle" and "tortoise" interchangeably (Schneider and Everson 1989), it should come as no surprise that the "tortoise" shell illustrated therein bears a closer resemblance to a turtle than it does to the Desert Tortoise (*Gopherus* spp.).

Enticed by the accounts of previous herpetologists who had witnessed this ritualistic dance, future American Museum of Natural History herpetology curator Charles Mitchill Bogert caught a plane in 1932 to the Hopi pueblo of Shongopovi to experience the dance for himself and record "data of a herpetological as well as of an ethnological character." Bogert indeed made every effort to identify the herpetological species involved in the dance, committing acts of trespass that betrayed the sacred nature of their Native American hosts and their rituals in what today would be clear archaeological and anthropological ethics violations. After the ceremony, Bogert and a cohort tailed the priests off the mesa top, "keep[ing] sufficiently close… so that with the aid of a small telescope it was possible to observe exactly where the snakes were liberated" at a sacred sandstone shrine into cracks and holes in the rock. When the priests left, the two searched the area to identify what snakes they could, collecting one rattler for later examination and identification. This specimen was sent to herpetologist Laurence M. Klauber, the foremost authority on rattlesnakes, who pickled it and, upon further examination, found to his surprise that its fangs had been entirely removed, leading Klauber to remark: "Offhand, it doesn't seem to me that the underworld gods would be disposed to send too much rainfall in return for so damaged a Western Union messenger" (Bogert 1933).

Among the reptiles recorded in the ceremony during Bogert's stay was the Western Pond Turtle, whose shells were used as turtle-shell rattles worn strapped to the leg as part of the ceremonial garb. Bogert also observed other turtle species' shells used in the Snake Dance, a small Desert Tortoise (*Gopherus* sp.) shell and two box tortoises (Bogert 1933).

With so many turtle species to chose from, this begs the question: how did Western Pond Turtles appear in the American Southwest? Although Arizona is well outside of the Western Pond Turtle's natural range, it is possible the

shells may have been obtained through barter with neighboring tribes. While such a practice specific to the Western Pond Turtle remains undocumented, other travel paths—far more unconventional ones—have come to light.

Years later, with their stock of turtle-shell rattles apparently dwindling, the Hopi would find themselves in receipt of a wooden crate full of Western Pond Turtles from the most unlikely of sources—a group of schoolchildren. As recounted in a 1951 article in *The Desert Magazine*, Chief Tewaquaptewa of the Hopi pueblo of Oraibi inadvertently stirred the interest of "The Trailfinders" (aka, The Trailfinders School for Boys), a boy's organization in Southern California, to resupply his village with Western Pond Turtle shells during a visit to their headquarters circa the winter of 1950 (James 1951).

> [Tewaquaptewa] explained to them that the Hopi ceremonial dances are nearly all prayers for rain and for bountiful crops, so in these ceremonies they use costumes and accoutrement suggestive of anything pertaining to water; hence, the choice of turtle shells as the material for dance rattles. In the arid Painted Desert these turtle shells are hard to find. They are precious things to be treasured through the years (James 1951).

As Chief Tewaquaptewa confessed, "despite the care given to their preservation," Oraibi was experiencing a "serious shortage" in its supply of shells. He had hoped to gather new turtle-shell rattle material during his trip to California.

Since his visit was ill timed with the Western Pond Turtle's winter brumation, the chief returned to his village empty handed. Sensing his disappointment, the boys of The Trailfinders took it upon themselves to organize a spring turtle hunt. The following May, The Trailfinders began scouring Sespe Creek, Piru Creek, and the canyons of the Santa Monica Mountains in search of older specimens at least five inches in length, until a dozen "husky" Western Pond Turtles had been collected. These they packed live in wet moss and shipped to Winslow, Arizona, where a young Hopi boy collected the package and returned to Oraibi (Fig. 7). After much to-do welcoming the dozen turtles to Oraibi, that evening the turtles were ceremonially killed, their shells cleaned with the dew claws of a sheep or deer, and then dried for later use as turtle-shell rattles (James 1951).

Curiously enough, a similar exchange was recorded in the story "Turtle Shells" in artist and author Frank G. Applegate's 1929 collection of stories about the Hopi pueblos. As the story goes, on the last day of her visit to the Hopi pueblo of Walpi, a "nice bohana [white] lady" from Baltimore asked the village chiefs, "What do you need here most at Hopi to make everyone happy?" The village chiefs talked amongst themselves before answering, "turtle shells." Apparently, the village was experiencing a shortage of turtle shells to make rain-dance rattles. Over the years, nearly all of their turtle-shell rattles had broken or worn out.

The bohana promised them she would send some turtle shells when she returned home to Baltimore. True to her word, the chiefs soon received a letter from Baltimore announcing the shells had been mailed. When a very large box arrived, the village chiefs were beyond surprised to find two giant turtle shells, each more than two feet long, much too large to tie onto their knees, much less dance with. After some thought, an "old corn clan chief" said: "These turtles are father and mother of all the turtles and maybe they are very big medicine for rain." So they put prayer feathers on the shells, placed them in their kivas, and prayed to the gods for rain. The following week, it rained so hard the village nearly washed away.

Realizing there was too much medicine in such large turtle shells, the village chiefs removed them from the kiva and buried them in their fields instead—to water their corn rather than their village. The story closed with a cautionary, "do not ask kind bohana ladies for turtle shells… to make [too much] rain with bohana turtle medicine they do not understand" (Applegate 1929).

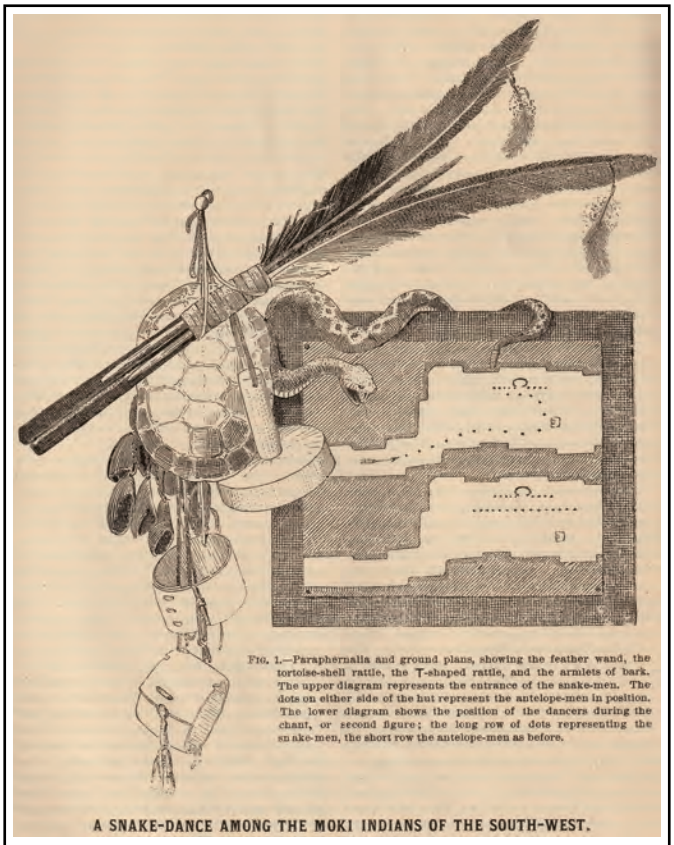
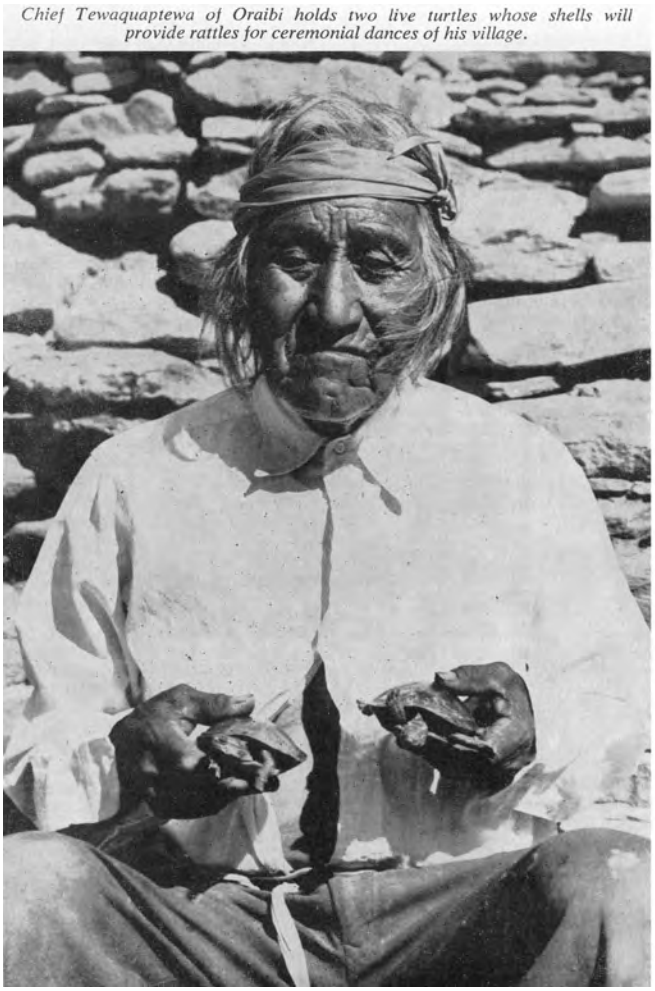


Fig. 1.—Paraphernalia and ground plans, showing the feather wand, the tortoise-shell rattle, the T-shaped rattle, and the armlets of bark. The upper diagram represents the entrance of the snake-men. The dots on either side of the hut represent the antelope-men in position. The lower diagram shows the position of the dancers during the chant, or second figure; the long row of dots representing the snake-men, the short row the antelope-men as before.
A SNAKE-DANCE AMONG THE MOKI INDIANS OF THE SOUTH-WEST.

Fig. 6. Featured in the 1887 article "An Indian Snake-Dance" in the popular science magazine *The Swiss Cross*, a full-page diagram illustrates some of the ceremonial paraphernalia involved in the snake dance as well as a schematic of the ceremony itself. Front and center are the customary "tortoise-shell rattle" and rattlesnake, as well as bark armlets and a feather wand. The so-called "tortoise" shell bears a closer resemblance to the mud turtles (*Kinosternon* spp.), Box Turtle (*Terrapene ornata*), or Western Pond Turtle than it does to the Desert Tortoise (*Gopherus* spp.).


Chief Tewaquaptewa of Oraibi holds two live turtles whose shells will provide rattles for ceremonial dances of his village.

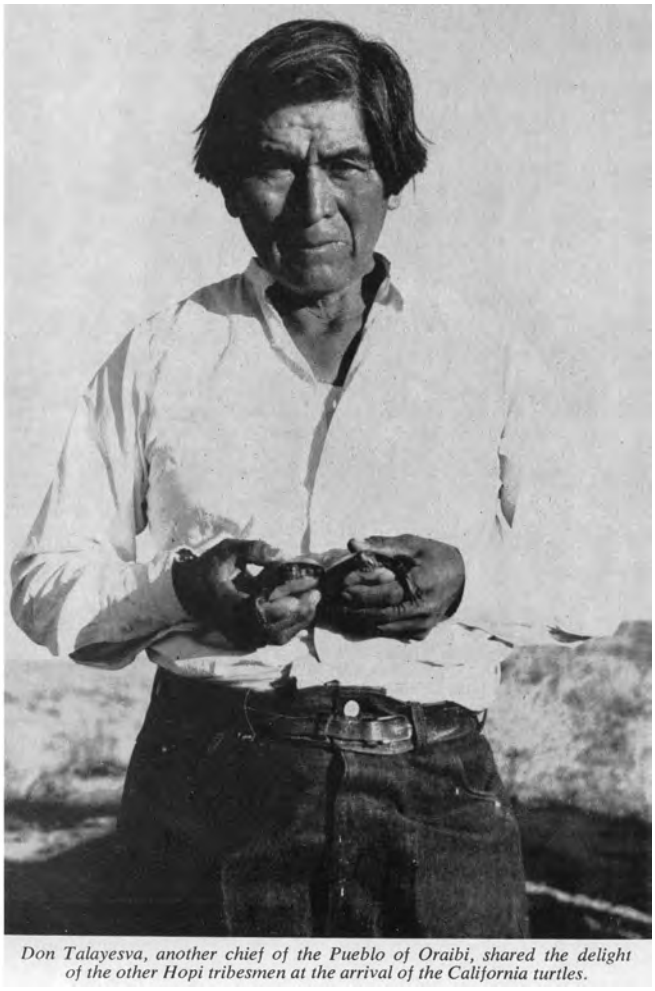

Don Talayesva, another chief of the Pueblo of Oraibi, shared the delight of the other Hopi tribesmen at the arrival of the California turtles.

Fig. 7. In the 1950s, schoolboys from The Trailfinders, a boy's organization in Southern California, scoured their local creeks in search of western pond turtle specimens. Months earlier, Hopi Chief Tewaquaptewa had mentioned during a visit with the boys club that he had been unsuccessful in procuring turtle shells, which were fashioned into turtle-shell rattles for ceremonial dances. To ameliorate the tribe's "serious shortage" of shells, the boys collected a dozen western pond turtles and shipped them live to Chief Tewaquaptewa's Oraibi pueblo, which graciously welcomed the gift. Chief Tewaquaptewa (left) and Chief Don Talayesva (right) pose with two of the turtles before they were ceremonially killed (James 1951, p. 22 & p. 23).

The Shell Game – Moving Pieces

Turtles and tortoises present a storable and portable food resource (protein, water), but also have a utilitarian non-food value (Schneider and Everson 1989), all of which makes them valuable as trade items. But as illustrated herein, tracking their movement can be difficult.

Translocating turtles and tortoises beyond their natural range is not unheard of. One such example of chelonian shells as trade items between Native American tribes is a Pleistocene-era Desert Tortoise (*Gopherus* sp.) shell recovered during the excavation of Lehman Cave in Great Basin National Park, Nevada, some 150 miles north of the species' present range (Santucci et al. 2001). At the turn of the twentieth century, we can also look to the translocation of Western Pond Turtles by European settlers from their native California into several locations throughout Nevada east of the Sierra Nevada, where the species' natural, albeit limited, range is largely believed to have been restricted to the Carson River, Truckee River, and Walker River (La Rivers 1942, Bury 2017). As early as 1887, Fish Commissioner of Nevada W.M. Cary announced the introduction of Western Pond Turtles to Nevada from California's Sacramento Valley:

> Believing the soil and waters of this State were adaptable to the growth of eatable terrapin, I so construed the law defining the duties and powers of Fish Commissioner as to warrant me to the small expenditure of funds for this purpose. I therefore purchased one hundred and eighty and distributed them throughout the State. They have been looked after by gentlemen taking interest in them and I am happy to report every probability of terrapin culture a success (Cary 1889).

The importance of the Chief Tewaquaptewa anecdote in particular is twofold. Not only does it demonstrate the mechanism by which Western Pond Turtle shells may have emi-

grated from California to Arizona, it demonstrates intent to import or trade the Western Pond Turtle for its shell by Native American groups outside of California. Chief Tewaquaptewa had hoped to collect turtle shells during his trip to California, suggesting this might not be the first time the Hopi had undertaken such an expedition. Applegate's and Cary's stories are just as informative. They demonstrate that European settlers and land managers may have also played their part in transporting turtles beyond the limits of their natural range.

Perhaps the Western Pond Turtle's poor showing in the archaeological record reflects an overall anathema by western Native Americans. Or perhaps the turtle's poor representation reflects the search biases and blind spots of the –ologists charged with deciphering human history. No matter the reason, the few archaeological and modern records combined suggest that Western Pond Turtles did play some role, however inconsequential, as a ceremonial or a subsistence item for select Native American groups in California *and* Arizona. It is this very same scarcity that allows us to better appreciate the rare occasions when the Western Pond Turtle *does* appear. Whether as a stone effigy or pendant, a bone shard or a rattle, each occasion serves as a reminder of the Western Pond Turtle's long history in the western United States.

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References

Applegate, Frank G. 1929. *Indian Stories from the Pueblos*. J.B. Lippincott, Philadelphia. 178 p.

Arax, Mark and Rick Wartzman. 2003. *The King of California: J.G. Boswell and the Making of a Secret American Empire*. Public Affairs, New York. 558 p.

Barrett, Samuel Alfred. 1908. Pomo Indian Basketry. *University of California Publications in American Archaeology and Ethnology* 7(3):133–308.

Barrett, Samuel Alfred. 1952. Material Aspects of Pomo Culture: Part One. *Bulletin of the Public Museum of the City of Milwaukee* 20(1):1–260.

Bell, Christopher J., Jacques A. Gauthier, and Gabe S. Bever. 2009. Covert Biases, Circularity, and Apomorphies: A Critical Look at the North American Quaternary Herpetofaunal Stability Hypothesis. *Quaternary International* 217(2010):30–36.

Bogert, Charles Mitchill. 1933. Notes on the Snake Dance of the Hopi Indians. *Copeia* 1933(4):219–221.

Bohakel, Charles A. 1977. *The Indians of Contra Costa County: The Costanoan and Yokuts Indians*. P. & H. Publishers: Amarillo, Texas. 40 p.

Bourke, John Gregory. 1884. *The Snake-dance of the Moquis of Arizona: Being a Narrative of a Journey from Santa Fé, New Mexico, to the Villages of the Moqui Indians of Arizona, with a Description of the Manners and Customs of this Peculiar People, and Especially of the Revolting Religious Rite, the Snake-dance; to which is Added a Brief Dissertation Upon Serpent-worship in General, with and Account of the Tablet Dance of the Pueblo of Santo Domingo, New Mexico, Etc*. C. Scribner's Sons: New York. 371 p.

Brown, Vinson and Douglas Andrews. 1969. *The Pomo Indians of California and their Neighbors*. Naturegraph Publishers: Healdsburg, California. 64 p.

Bury, R. Bruce. 2017. Biogeography of Western Pond Turtles in the Western Great Basin: Dispersal Across a Northwest Passage? *Western Wildlife* 4: 72–80.

Cary, W.M. 1889. Biennial Report of the Fish Commissioner of the State of Nevada: 1887–1888. Carson City, Nevada. pp 3–7.

Cooper, James Graham. 1859. Route near the Forty-Seventh and Forty-Ninth Parallels, Explored by I. I. Stevens, Governor of Washington. Zoological Report No. 4. Report Upon the Reptiles Collected on the Survey. Pp. 292–306, 11 plates *in: Reports of Explorations and Surveys, to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean*. Volume XII, Part III, Thomas H. Ford, Washington, D.C.

Dillon, Brian D. and Judy Porcasi. 1990. Turtling at Ancient Lake Tulare. *TULARG Report: Newsletter of the Tulare Lake Archaeological Research Group* 3(6):1–9.

Dillon, Brian D., Judy Porcasi, Ted Gutman, Paul Porcasi, and Frank Wood. 1991 Preliminary Report on Excavations at the Creighton Ranch Site (CA-TUL-1613), Tulare County, California. Pp 61–70 in Wallace, William J. and Francis A. Riddell (eds.). *Contributions to Tulare Lake Archaeology I: Background to a Study of Tulare Lake's Archaeological Past*. The Tulare Lake Archaeological Research Group.

Fewkes, Walter J. 1894. The Snake Ceremonials at Walpi. *Journal of American Ethnology and Anthropology* 4:1–126.

Fisher, Jacob L. 2018. Archaeology and Biogeography of the Western Pond Turtle (*Actinemys marmorata*) in the Puget Sound Region. *Ethnobiology Letters* 9(2):180–188.

Gayton, Anna Hadwick. 1948. Yokuts and Western Mono Ethnography Volume 1: Tulare Lake, Southern Valley, and Central Foothill Yokuts. *University of California Anthropological Records* 10(1):x, 1–140.

Gillreath-Brown, Andrew and Tanya M. Peres. 2017. Identifying Turtle Shell Rattles in the Archaeological Record of the Southeastern United States. *Ethnobiology Letters* 8(1):109–114.

Hattori, Eugene M. 1982. The Archaeology of Falcon Hill, Winnemucca Lake, Washo County, Nevada. *Anthropological Papers (Nevada State Museum)* (18):xx, 1–208.

Hays, David W., Kelly R. McAllister, Scott A. Richardson, and Derek W. Stinson. 1999. *Washington State Recovery Plan for the Western Pond Turtle.* Washington Department of Fish and Wildlife, Olympia. 66 p.

Heizer, Robert F. 1949. The Archaeology of Central California Volume 1: The Early Horizons. *University of California Anthropological Records* 12(1):iv, 1–74.

Heye, George G. 1921. Certain Artifacts from San Miguel Island, California. *Indian Notes and Monographs* 7(4):5–211.

Holland, Dan C. 1989. Synopsis of the Ecology and Current Status of the Western Pond Turtle (*Clemmys marmorata*). Unpublished Report to USFWS National Ecology Research Center, Ft. Collins, CO: 38 p.

Hovens, P., W. J. Orr., and L. A. Hieb, eds. 2004. *Travels and Researches in Native North America, 1882–1883. Herman ten Kate*. University of New Mexico Press, Albuquerque, New Mexico. xi, 411 p. [Original edition: Ten Kate, H. F. C., Jr. 1885. *Reizen en Onderzoekingen in Noord-Amerika*. E. J. Brill, Leiden, The Nertherlands. vii, 464 p., 1 map, 2 plates]

Hylkema, Mark G. 1994. Tamien Station Archaeological Project. Pp. 249–270 in: Bean, L. J. *The Ohlone Past and Present: Native Americans of the San Francisco Bay Region*. Ballena Press Anthrolopological Papers No. 42. Ballena Press: Menlo Park.

James, Harry. 1951. Turtles for Tewaquaptewa. *Desert*. 14(14):22–23.

Kroeber, A.L. 1925. Handbook of the Indians of California. *Smithsonian Institution Bureau of American Ethnology Bulletin* 78: xviii, 995 p., 83 plates.

La Rivers, I. 1942. Some New Amphibian and Reptile Records for Nevada. *Journal of Entomology and Zoology* 34:53–68.

Latta, Frank Forrest. 1949. *Handbook of Yokuts Indians*. Bear State Books: Oildale, California, xiii, 287 p.

Loeb, Edwin Meyer. 1926. Pomo Folkways. *University of California Publications in American Archaeology and Ethnology* 19(2):149–405.

Lovich, Jeffrey E., Charles T. LaRue, Charles A. Drost, and Terence R. Arundel. 2014. Traditional Cultural Use as a Tool for Inferring Biogeography and Provenance: A Case Study Involving Painted Turtles (*Chrysemys picta*) and Hopi Native American Culture in Arizona, USA. *Copeia* 2:215–220.

Mayfield, Thomas Jefferson. 1993. *Indian Summer: Traditional Life Among the Choinumne Indians of California's San Joaquin Valley*. Heydey Books, Berkeley, 125 p.

McGinnis, S. M. and R. C. Stebbins 2018. *Peterson Field Guide to Western Reptiles and Amphibians, Fourth Edition*. Houghton Mifflin, Boston, xii, 560 p.

Santucci, Vincent L., Jason Kenworthy, and Ron Kerbo. 2001. *An Inventory of Paleontological Resources Associated with National Park Service Caves*. United States Department of the Interior, National Park Service, Geological Resource Division Technical Report NPS/NRGRD/GRDTR-01/02. 50 p.

Schneider, Joan S. 1996. *The Desert Tortoise and Early Peoples of the Western Deserts*. A Special Report Prepared for the Desert Tortoise Preserve Committee, Inc. March: 10 p.

Schneider, Joan S. and G. Dicken Everson. 1989. The Desert Tortoise (*Xerobates agassizii*) in the Prehistory of the Southwestern Great Basin and Adjacent Areas. *Journal of California and Great Basin Anthropology* 11(2):175–202.

Strudwick, Ivan H. and Henry C. Koerper. 2006. A Unique Turtle Effigy from CA-ORA-269. *Proceedings of the Society for California Archaeology* 19:145–150.

Udall, Sharyn R. 1992. The Irresistible Other: Hopi Ritual Drama and Euro-American Audiences. The Drama Review 36(2):23–43.

Waters, Frank. 1977. *Book of the Hopi*. Penguin Books Ltd.: New York, New York, 345 p.

Webster's Revised Unabridged Dictionary. 1913. "Ellachick." G. & C. Merriam Co. 15 Nov. 2020. https://www.thefreedictionary.com/Ellachick. Accessed on 15 Nov. 2020.

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A Gift that Keeps on Giving: Laurence Klauber, Lyman Belding, *The West American Scientist*, and a 1936 Holiday-Season Greeting

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'Tis the Season, 1936

On 15 December 1936, Laurence Klauber (21 December 1883–8 May 1968) signed off on an interesting holiday greeting that was mailed to an unknown number of his contemporaries who shared his enthusiasm for herpetology. It was an eight-page document, on seven pages of which were reprinted two short papers published in 1887 by Lyman Belding in *The West American Scientist* (the entire document is reproduced here as Appendix 1). The verso of the last page is inscribed with a holiday greeting and decorated with a holly-draped bell, a Christmas tree, and three holly-leaf pairs reminiscent of cavorting bats doing loop-de-loops to form a loose frame around the inscription.

Although Klauber (Fig. 1) was an electrical engineer by profession, at the time he distributed his holiday greeting he had already established himself in a prominent position among herpetologists in the western United States. He was well into a prolific publishing career in herpetology, having by the end of 1936 already published 37 papers in the field (Anonymous, 1945). His personal collection of preserved amphibians and reptiles grew to include well over 30,000 specimens and he maintained an extensive personal library; both collections were donated to the San Diego Natural History Museum several years before his death (Brattstrom, 1968; Shaw, 1969; Adler, 1989:97–98; Hollingsworth and Bauer, "1999" 2000). Even a casual perusal of his extraordinary two-volume monographic work on rattlesnakes (Klauber, 1956) will reveal his intimate knowledge of the voluminous literature, and it comes as no surprise that reprinting and circulating a pair of little-known titles from a small regional journal would strike him as a grand idea.

The West American Scientist and Charles R. Orcutt

The West American Scientist (originally *The West-American Scientist*, but the hyphen was dropped from the title after the first few issues) was launched in San Diego, California in December of 1884 and published by Charles Russell Orcutt (27 April 1864–24 August 1929). It was one among a small number of serial publications dedicated to the natural sciences on the west coast of the United States in the late 1800s (others include *Proceedings of the California Academy of Sciences* [started in 1854 and still being published], *Bulletin of the California Academy of Sciences* [1884–1887], *Zoe* [1890–1908], and *The Oregon Naturalist* [1894 – 1898[1]]). At its inception the stated intent was for *The West American Scientist* to be a monthly periodical, but it only rarely achieved such regularity in its release. Publication dates became increasingly sporadic in its later years, and the content varied widely in those volumes, including some issues that were dominated by species lists, price lists of specimens for sale by Orcutt, and advertisements (Jepson, 1929). Issues were released through 1921; a full summary of the publication history was provided by Coan (1966).

The West American Scientist was one of five serial publications established by Orcutt (Coan, 1966) and was by far the most successful; the others were *West American Mollusca* (1900–1902, 14 issues totaling 68 pages), *California Art & Nature* (1901–1902, 12 issues totaling 230 pages), *Orcutt's Mexico* (1913, three issues totaling 48 pages), and *Jamaica Naturalist* (1927–1928, four issues totaling 20 pages). He also was likely involved with the version of *The Oregon Naturalist* that was published in Eugene, Oregon in 1891 (see Appendix 2). Orcutt (Fig. 2) is best remembered for his contributions to malacology and botany (Jepson, 1929; Coan, 1966), and as far as we know he never personally published on herpetological subjects. Nonetheless, his name will tickle the ear of those familiar with the herpetofauna of southern California and the Baja California peninsula, because the strikingly colorful *Sceloporus orcutti* was named in his honor by Leonhard Stejneger (1893:180–181) based on material collected in southern California "Just bordering the Mexican

[1] There are two separate publications that bear this name; one was published only during the year 1891. The history of those publications is complicated, and related in various ways to the historical sketch we provide here; a discussion is provided in Appendix 2.

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Fig. 1. Laurence Klauber in his garage workshop, early 1930s. This photo was taken within a few years of his sending the 1936 'holiday greeting' of Lyman Belding's herpetological papers. Image courtesy of Kraig Adler.

boundary, 50 miles east of San Diego by wagon road" (Orcutt in Stejneger, 1893:181). Stejneger noted that the geographic range of *Sceloporus orcutti* "probably penetrates some distance south into the northern part of Lower California [Baja California, Mexico]" (Stejneger, 1893:181) in the southern part of which he thought it would be replaced by *Sceloporus zosteromus*. *Sceloporus orcutti* is now known to range along much of the length of the Baja California peninsula, and overlaps in its distribution with *Sceloporus zosteromus* (Grismer, 2002). The northernmost populations of *Sceloporus zosteromus* are classified as *Sceloporus zosteromus rufidorsum*, the type specimen of which is now housed in the Smithsonian Institution as a macerated skeleton (Cochran, 1961:142). That type specimen was collected by Lyman Belding (Yarrow, 1882a), the author of the two short papers reprinted in Klauber's holiday greeting.

Lyman Belding

Lyman Belding is another name that is likely to be familiar only to a few herpetologists. As far as we can ascertain his herpetological publications were limited to the two pieces from 1887 that were reprinted by Klauber. He is best remembered for his collections and work in ornithology, but his collecting proclivities, attention to detail, and amiable personality brought him eponymous recognition in several quarters of natural history, with two plants, one mollusk, one fish, one anuran, one lizard, one mammal, and five birds named in his honor; a sixth bird carries a common name that recognizes Belding (Table 1).

Belding's autobiographical notes were completed in June of 1916, about a year and a half before his death, and served as the foundation for much of the material in his obituary notices published in *The Condor* and *The Auk* (W. Fisher, 1918 and A. Fisher, 1920, respectively). The manuscript was typeset and posthumously published (Belding, 1919) in the *Proceedings and Collections of the Wyoming Historical and Geological Society* (based in Wilkes-Barré, in the Wyoming Valley of northeastern Pennsylvania)[2]. The original autobio-

[2] The published version of Belding's autobiographical sketch (Belding, 1919) includes an 'appreciation' and appended list of (mostly) ornithological publications authored by Belding (pp. 177–184). That section is attributed to "Walter K. Baker, in the Condor Eagle, Rock, Cal." [Commas placed as published]. The text and list of publications appeared verbatim in Walter K. Fisher's report in The Condor (1918), but the paragraphs in Fisher's version were interspersed with extracts from Belding's autobiographical notes, and the location was given in his byline as Palo Alto, California. At that time, The Condor was published in Hollywood, California and was edited by Joseph Grinnell, with Harry Swarth as Associate Editor (not a Baker in sight). We assume that the 1919 rendering of the patronymic as "Baker" was a typographical error in the *Proceedings and Collections of the Wyoming Historical and Geological Society*. 'Eagle Rock' is just east of Hollywood.

graphical notes are now housed at the Huntington Library, Art Museum, and Botanical Gardens in San Marino, California (WorldCat OCLC accession number 733847600).

Belding was born in West Farms, Massachusetts on 12 June 1829. His family moved to Pennsylvania when he was a young boy, where he developed a love of the outdoors, an affinity that stayed with him for the remainder of his life. He confessed to neglecting school to walk in the woods with his gun but claimed he was generally faithful to the demands placed upon him by the family farm, being drawn away only occasionally to gather ripe chestnuts in the nearby hills (W. Fisher, 1918:53). Chestnuts apparently were a favorite food because he noted that one of the biggest challenges to honesty that he faced as a young boy was his failed attempt to spurn the temptation repeatedly to steal a few chestnuts at a time from the desk of one of his father's workers; in the end he succumbed and ate them all (W. Fisher, 1918).

At the age of 21 he signed on as a hand on a whaling ship and on his first voyage visited the Azores, South Africa, New Zealand, Guam, the Bering Strait, and Honolulu. After arriving in Honolulu he joined several other members of the crew and deserted to avoid continued abuse by the captain of his ship, an experience the recalling of which he later described as "humiliating" (Belding, 1919:144). Belding joined another crew bound for the Galapagos Islands and there made observations of tortoises, sea lions, cacti, and a lava-tube cave. The ship continued south along the coast, rounded Cape Horn, and Belding eventually returned home in 1854. Two years later he relocated to Stockton, California, and retired from business there in 1875. In 1876 he received a copy of *Ornithology of California* (Cooper, 1870), found his passion, and began a new career as a field-naturalist and collector. Belding frequently hunted and travelled alone (Belding, 1919:169), but the reflections of Herman Frederik Carel Ten Kate, who joined Belding for parts of a trip through portions of Baja California, provide a few glimpses of Belding as a field biologist (Ten Kate, 1885; van der Pas, 1977; Hovens et al., 2004). Belding travelled and collected extensively in California and Baja California, Mexico, often traversing ground that was largely unexplored by naturalists. He sent many specimens to the United States National Museum at the Smithsonian Institution, and was repaid with expansive replies and encouragement from Spencer Baird and Robert Ridgway, and a certain largesse from Baird who offered to send any publications Belding might need from the catalogue of the United States National Museum (W. Fisher, 1918:57, footnote).

In 1881 Baird and Ridgway encouraged him to explore Guadalupe and Cedros islands off the west coast of Baja California. Local contacts convinced him that, with the military garrison having abandoned the island of Guadalupe, local conditions were not favorable for survival; he went instead to Cedros Island. It was "quite destitute of birds" (Belding, 1900:2), but he collected type material of the cormorant *Phalacrocorax dilophus albociliatus* (Ridgway 1884) and "a new lizard or two" (Belding, 1900:2). One of the lizards he collected was subsequently designated by Stejneger (1894) as the type specimen of the whiptail lizard *Verticaria beldingi* (now *Aspidoscelis hyperythra beldingi*).

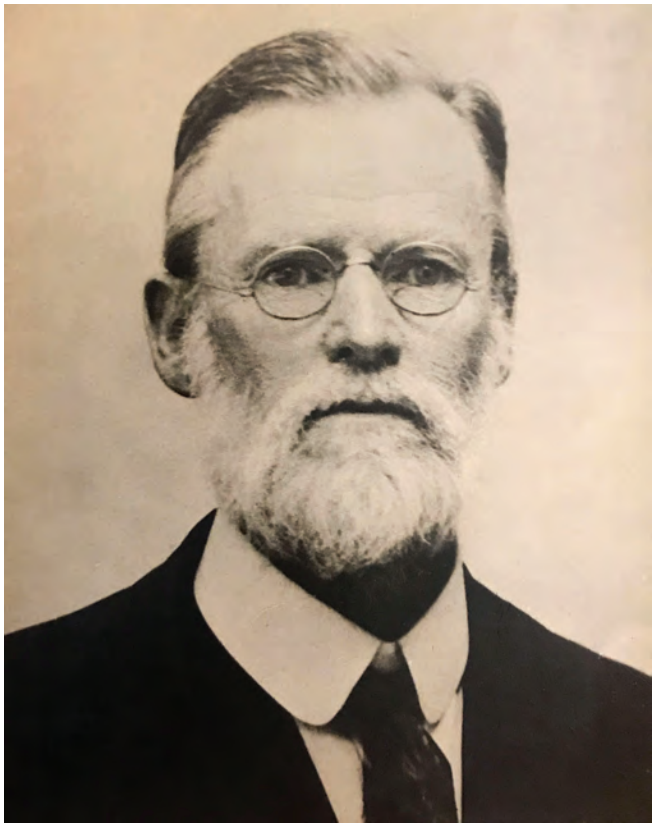

Fig. 2. Charles Orcutt, date unknown. Orcutt is best known for his work in malacology and botany, but the lizard *Sceloporus orcutti* was named in his honor by Leonhard Stejneger in 1893. Orcutt started publication of *The West American Scientist* in 1884. Image courtesy of the San Diego Natural History Museum Research Library.

Belding was a deliberate and careful collector, usually adhering to his own advice (Belding, 1887c:227) to exercise "the patient use of field glasses" so he could identify animals prior to shooting them, with the ultimate aim of avoiding "wanton waste of bird life" (Belding 1887c:228). He contributed many specimens to the United States National Museum (Yarrow 1882b; Belding 1900) but by the mid 1880s also became a champion for the development of a first-class systematic collection of birds in California (A. Fisher, 1920). He encouraged his friends and correspondents to contribute to the development of such a collection at the California Academy of Sciences (W. Fisher, 1918; A Fisher, 1920), but the effort ended in tragedy when his specimens that were curated at that institution were lost in the fire that consumed the Academy after the San Francisco earthquake in 1906 (W. Fisher, 1918; see Leviton and Aldrich, 1997).

Writing and publishing were not priorities for Belding, and he was reported to consider writing "rather tedious" (W. Fisher, 1918:59), convinced his time was better spent in pur-

Table 1. Taxa named in honor of Lyman Belding, with currently recognized status and higher taxonomic placement. The scientific name *Aphelocoma californica obscura* Anthony 1889 carries no reference to Belding, but the common name of the bird was given as Belding's Jay and persists today as Belding's Scrub-Jay. Scientific names of birds follow the 2020 IOC World Bird List (Gill et al., 2020).

Original name	Current name	Higher Taxon
Nolina beldingii Brandegee 1890	*Nolina beldingii* Brandegee 1890	Asparagaceae
Orthocarpus beldingii Greene 1885	*Castilleja beldingii* (Greene, 1885)	Orobanchaceae
Bulimulus inscendens var. *beldingi* Cooper 1892	*Naesiotus beldingi* (Cooper, 1892)	Bulimulidae
Cottus beldingii Eigenmann & Eigenmann 1891	*Cottus beldingii* Eigenmann & Eigenmann, 1891	Cottidae
Bufo beldingi Yarrow 1882a	*Bufo punctatus* (Baird & Girard, 1852)	Bufonidae
Verticaria beldingi Stejneger 1894	*Aspidoscelis hyperythra beldingi* (Stejneger, 1894)	Teiidae
Spermophilus beldingi Merriam 1888	*Urocitellus beldingi* (Merriam, 1888)	Sciuridae
Pagolla wilsonia beldingi Ridgway 1919	*Charadrius wilsonia beldingi* (Ridgway, 1919)	Charadriidae
Oceanodroma beldingi Emerson 1906	*Oceanodroma leucorhoa leucorhoa* Viellot, 1818	Hydrobatidae
Rallus beldingi Ridgway 1882	*Rallus obsoletus beldingi* Ridgway, 1882	Rallidae
Geothlypis beldingi Ridgway 1882	*Geothlypis beldingi* Ridgway, 1882	Parulidae
Passerculus beldingi Ridgway 1885	*Passerculus sandwichensis beldingi* Ridgway, 1885	Emberizidae

suit of his outdoor activities. He said of himself, "I could do very little writing, because in order to write I must shut myself up and give it my undivided attention, and several days of that sort of thing made an invalid of me, always having been accustomed to an outdoor life" (Belding, 1919:172). Nonetheless, he left an interesting and varied published record, most of which is dedicated in one way or another to his ornithological interests. Incomplete bibliographies, mostly covering his ornithological work, were published by W. Fisher (1918; reprinted in Belding, 1919) and A. Fisher (1920). His herpetological writing was limited to the two papers reprinted and redistributed by Klauber, and other works touched on ethnographic or archaeological observations (e.g., Belding, 1885, 1892b), mammalogical observations he deemed worthy of dissemination (e.g., Belding, 1890b), and reflections and advice for a new generation of natural scientists (Belding, 1887c, 1900). He is best known for his monograph *Land Birds of the Pacific District* (Belding, 1890a). A companion volume on the water birds was prepared but never published; it is now housed at the Bancroft Library at the University of California at Berkeley (W. Fisher, 1918). His distaste for writing is indicated by the fact that many of Belding's publications are short contributions to popular-press journals such as *Bird Lore*, or regional publications like *Zoe* and *The West American Scientist*. He achieved the ultimate in brevity with the publication of a single sentence documenting his collection of the third known specimen of the white-throated sparrow in California (Belding, 1892a). One of the more interesting categories of his creative writings is discussed near the end of his autobiographical sketch (Belding, 1919:172–173). He had a fondness for writing music based on bird songs: "I have copied many songs that had regular intervals and could be expressed by our musical system," including one composition the first part of which came to him while sleeping, and the conclusion of which was finished based upon the songs of thrushes in a nearby sequoia grove (Belding, 1919:172).

In his essay *A Part of My Experience in Collecting* Belding (1900:3) reflected that he "made the mistake of collecting many things of which I knew little or nothing, instead of confining myself almost entirely to birds." In a footnote to a discussion of Belding's Cedros Island expedition, W. Fisher (1918:57) noted that "Little mention is made in the autobiographical notes of herpetological collecting," but Belding was listed 35 times by Yarrow (1882b) as a contributor of herpetological specimens to the United States National Museum. Moreover, the eponymous recognition in the description of the new whiptail from Cedros Island was owing in part to the "extensive and excellent herpetological collecting in Lower California as well as in Upper California [that] has never been adequately recognized" (Stejneger 1894:18).

Belding was described as being reserved, with a tinge of diffidence, and as having a quiet, unassuming, genial, and lovable nature (W. Fisher, 1918; A. Fisher, 1920). His subtle humor is reflected in his choice to circulate to his friends a photographic portrait of himself in which a fly is prominently noticeable on his forehead (Fig. 3). He was the last of the pioneer ornithologists of California. When he died on 22 November 1917 he was 88 years old, and had the singular distinction (up through a moment before his death) of being the oldest living ornithologist in the United States (A. Fisher, 1920). He lived long enough to have (probably) learned of the emerging blight that attacked the American Chestnut trees beginning in the early 1900s. It was perhaps a blessing that he died before that favorite species of his youth would no longer live to flower and fruit across its once expansive range. When naming a new species of ground squirrel in Belding's honor C. Hart Merriam remarked that Belding's contributions to zoology, and especially ornithology, of California "entitle him to lasting remembrance" (Merriam, 1888:327). Lyman Belding is buried in Block 25, Lot 2 at the Stockton Rural Cemetery in Stockton, California, not far from the mountainous range of the squirrel that bears his name.

The Giving Gift

The novelty of herpetological observations published by Belding, combined with the relatively obscure outlet in which they were published, and the death of Belding nearly 20 years earlier, are all reasonable justifications for Klauber's efforts to re-broadcast Belding's works 50 years after their initial publication. The papers themselves cover different aspects of Belding's engagement with herpetology. The first of the two (Belding, 1887a) was a reflection on the then (1887) relatively understudied Baja California peninsula, including a brief discussion of logistical challenges posed by thorny vegetation, fleas, ants, cockroaches, scorpions, skunks, and a lack of roads, food, and water in the region north of La Paz and south of the border. He also related anecdotes about reptiles, especially rattlesnakes, of the region, and provided preliminary opinions on regional biogeography of reptiles, and the relationship of species distributions with past geological events. The second paper (Belding, 1887b) is a list of 45 species he collected in Baja California, with brief annotations about localities, habitat, and local common names for some taxa. Appended to the main list are a list of six other species collected by John Xantus on the peninsula, three species collected by Belding from Cedros ("Cerros") Island, an additional six species listed by Yarrow (1882b) as occurring in the region, and a note on uncollected material of a 1,102-pound Leatherback sea turtle (*Dermochelys coriacea*). Numerous typographical errors in the list provide interesting and accidental nomenclatural synonyms.

We have seen several copies of Klauber's holiday greeting over the years and what strikes us each time is that there is an individuated history associated with each one. All of the copies we have seen bear unique marks upon them that provide insight into ownership, research interests, and personalities of the various people through whose hands each document has passed. The copy we reprint here (Appendix 1) has seven distinct markings on the front cover, and four are readily identifiable. Charles M. Bogert (4 June 1908–10 April 1992) printed his name in a bold black ink on the upper right corner. We suspect, but do not know, that he was the original owner of this copy; he met Klauber in 1926 while still in high school, and they were regular correspondents (Adler, 2007). Bogert was certainly in contact with Klauber about specific projects on snake systematics at least as early as 1935, when he was working on his master's thesis and acknowledged assistance from Klauber in preparation of his (Bogert's) first paper dedicated to *Salvadora* (Bogert, 1935; see also Bogert, 1939). Bogert moved from California to New York in 1936 and took a position as an assistant to G. K. Noble at the American Museum of Natural History; he later replaced Noble as curator and spent most of his career based in New York. His research interests included thermoregulation in reptiles, snake systematics, and various aspects of the herpetology of Mexico (Adler, 2007).

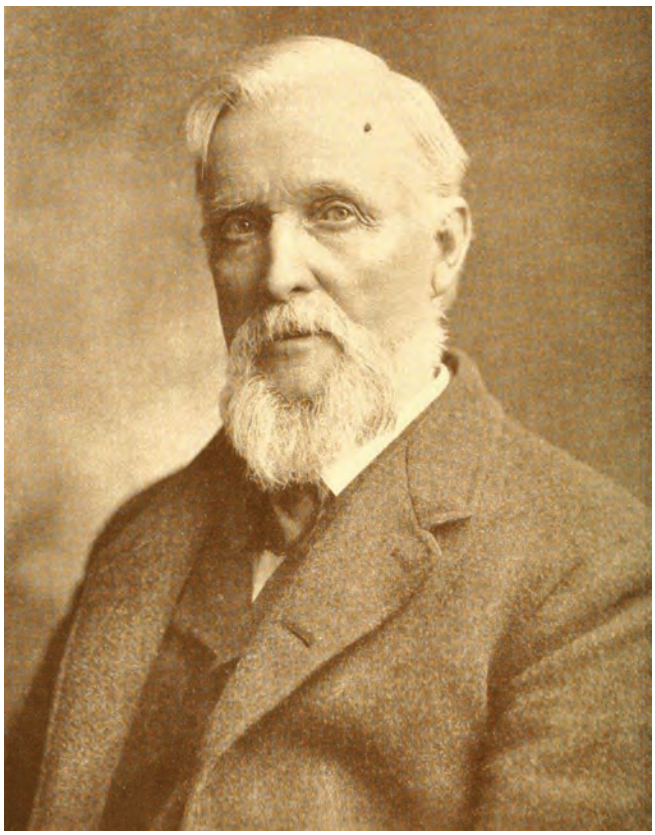

Fig. 3. Lyman Belding, circa 1903. Yes, that's a fly on his forehead. Belding was amused by the fly that "obtruded itself into the portrait" (W. Fisher, 1918:52, footnote) and chose that particular negative as the one from which he would print photos to be sent to his close friends. Reprinted with permission from A. K. Fisher's (1920) memorial published in *The Auk* 37(1).

Manny Rubio (4 January 1942–21 December 2017) marked the document twice with his ownership stamp; the first attempt yielded an incomplete printing of his last name, an error remedied by a second stamp offset just below and to the right of the first. We do not know when or from whom Rubio obtained the copy. Rubio was an accomplished professional photographer and natural history enthusiast with an interest in rattlesnakes that spanned many decades (Reist, 2018). He authored three books about venomous snakes and snakebite (Rubio, 1998, 2010; Rubio and Keyler, 2013), and an obituary notice on the death of Charles Bogert (Rubio, 1992). Rubio died unexpectedly in December 2017.

Tom Sinclair (12 July 1942–still extant) purchased portions of the Rubio library between the spring and autumn of 2018, and noted that Rubio's personal library contained many reprints from Bogert's collection (Tom Sinclair, personal communication, November, 2020). Sinclair left no markings on the document. Chris Bell (12 March 1966–still extant) purchased this copy of the 'holiday greeting' from Sinclair in the summer of 2018 and signed and dated it with a black ball-point pen. The document now resides in his personal library in Austin, Texas.

Three additional ownership marks are present on the front cover, the origins of which cannot be attributed to any individual owner. A capital letter C is printed in the upper right corner in red pencil, a cursive rendering in grey pencil of 'Belding 1887' is just left of the center of the top margin, and between Bogert's name and Bell's signature is a narrow piece of card-stock with a typed annotation 'Belding – 1887' that is glued to the document; it was cut from a larger piece of card stock with a shaky hand or a warped pair of scissors and is distinctly narrower on the side with the date.

The interior is free of markings, except for page 98, where two modifications were made in red ball-point pen. The first is a question mark following species no. 20 on the list, *Phrynosoma asio* Cope. That species is well documented from the Pacific coast states of Jalisco, Colima, Michoacán, Guerrero, Morelos, Oaxaca, and Chiapas, in Mexico, and from western Guatemala (Uetz et al., 2020), but outside of Belding's list it is not otherwise reported from the Baja California peninsula. The second marking on that page is an underlining of species no. 34 on the list, *Phimothyra grahami*, Baird and Girard. Nomenclaturally that species would now be recognized as *Salvadora grahamiae*, a species that also does not occur on the Baja California peninsula. The taxon that Belding saw there would now be recognized as *Salvadora hexalepis* (Grismer, 2002). The complicated nomenclature of *Salvadora* was discussed by Bogert (1939) and he cited Belding's paper in that monographic work. His obvious interest in *Salvadora* in the 1930s, and his long correspondence with Klauber in the context of that work support the idea that Bogert received his copy of the holiday greeting directly from Klauber. The red underlining of *Phimothyra grahami* may well have been done by Bogert, though not necessarily in the 1930s—he continued to work and publish on those snakes (Bogert, 1945), and sparked a renewed interest in systematics of the group late in his career (Bogert, 1985). Other papers from Bogert's library also are known to have been marked or annotated in red ink (Breck Bartholomew, personal communication, 2020).

Klauber's holiday-season greeting was a gift to his friends and colleagues, but those who were direct recipients of the reprinted works by Belding were clearly not the only ones to benefit from Klauber's gesture. As Aaron Bauer recently noted in the pages of this journal (Bauer, 2020), when libraries are broken up and dispersed, the individual items bring happiness to others, often simply through the possession of an item that once belonged to a friend or to an inspiring figure of the past. This forges a sense of connection across generations of scientists. We are living examples of this phenomenon. When Andy Price was diagnosed with cancer, he opened conversations with us about the future of the *Catalogue of American Amphibians and Reptiles*, of which he had been editor for many years. We agreed to take on the responsibility for the *Catalogue*, and our ability to do so, and to maintain Andy's high standards for catalogue accounts, was greatly enhanced by our acquisition of many books and papers that Andy had spent decades accumulating to support the mission of the *Catalogue*. We fear the loss of such connections in the future as the popularity of paper-based libraries wanes in the rising generation of herpetologists.

A direct transgenerational transfer of materials is one way in which Klauber's 1936 gifts continue to give. But his idea for a direct reproduction of relevant but difficult-to-obtain titles yielded and even greater legacy. Klauber's reprint of the papers by Lyman Belding was the inspiration for the Facsimile Reprints in Herpetology series that was begun by the Ohio Herpetological Society and continued and expanded by the Society for the Study of Amphibians and Reptiles (Adler and Bauer, 2020). Through that series, Klauber's *idea* led to an extraordinary output of facsimile reprints of 62 titles and over 23,000 pages thus far. That series is the material record of a successful program that spans six decades and promises a healthy future.

Although we are not looking forward to our own deaths quite yet, we comfort ourselves with the hope that our own bibliographic collections will find welcoming homes and play a part in the growth and development of future herpetologists in generations to come. We consider our efforts to build and annotate our collections as *our* gift that will keep on giving.

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References

Adler, K. 1989. Herpetologists of the past. Pp. 5–141 *in* Adler, K. (ed.), *Contributions to the History of Herpetology.* Contributions to Herpetology 5. Society for the Study of Amphibians and Reptiles, Oxford, Ohio.

Adler, K. 2007. Herpetologists of the past, part 2. Pp. 7–273 *in* Adler, K. (ed.), *Contributions to the History of Herpetology, Volume 2*. Contributions to Herpetology 21. Society for the Study of Amphibians and Reptiles, St. Louis, Missouri.

Adler, K., and A. M. Bauer. 2020. Facsimile Reprints in Herpetology: The society's first unique program. *Herpetological Review* 51(2):396–411.

Anonymous. 1945. Meet Dr. Laurence M. Klauber. *Herpetologica* 2(7–8):141–150.

Anthony, A. W. 1889. New birds from Lower California, Mexico. *Proceedings of the California Academy of Sciences*, Series 2, 2:73–82.

Baird, S. F., and C. Girard. 1852. Characteristics of some reptiles in the museum of the Smithsonian Institution. *Proceedings of the Academy of Natural Sciences of Philadelphia* 6:173.

Bauer, A. M. 2020. [In memory of Richard Wahlgren]. Pp. 37–39 *in* In memory of Richard Wahlgren (9 December 1946 – 5 October 2019) founding chairman of the ISHBH and book collector extraordinaire (by A. M. Bauer, D. Claesson, T. Madsen, and M. Lundberg). *Bibliotheca Herpetologica* 14(5).

Belding, L. 1885. The Pericue Indians. *The West-American Scientist* 1(4):21–22.

Belding, L. 1887a. Collecting in the Cape region of Lower California. *The West American Scientist* 3(24):93–97.

Belding, L. 1887b. Reptiles of the Cape region of Lower California. *The West American Scientist* 3(24):97–99.

Belding, L. 1887c. A few words to the young ornithologists of California. *The West American Scientist* 3(32):227–230.

Belding, L. 1890a. Land birds of the Pacific District. *Occasional Papers of the California Academy of Sciences* 2:1–274.

Belding, L. 1890b. The wolverine (*Gulo lusens*) in California. *Zoe* 1(10):303–304.

Belding, L. 1892a. *Zonotrichia albicolis* in California. *Zoe* 3(2):117.

Belding, L. 1892b. Some of the methods and implements by which the Pacific Coast Indians obtained game. *Zoe* 3(2):120–124.

Belding, L. 1900. A part of my experience in collecting. *The Condor – Bulletin of the Cooper Ornithological Club* 2(1):1–5.

[Belding, L.]. 1919. Autobiographical sketch by Lyman Belding. Of some of his life experiences, to which is added an appreciation of his work in ornithology, by Walter K. Baker, in the Condor, of Eagle Rock, Cal. *Proceedings and Collections of the Wyoming Historical and Geological Society, For the Year 1918*, 16:127–184, 1 plate.

Bogert, C. M. 1935. *Salvadora grahamiae virgultea*, a new subspecies of the patch-nosed snake. *Bulletin of the Southern California Academy of Sciences* 34(1):88–94.

Bogert C. M. 1939. A study of the genus *Salvadora*, the patch-nosed snakes. *Publications of the University of California at Los Angeles in Biological Sciences* 1(10):177–235.

Bogert, C. M. 1945. Two additional races of the patch-nosed snake, *Salvadora hexalepis*. *American Museum Novitates* 1285:1–14.

Bogert, C. M. 1985. [Report on sibling species now recognizable in the genus *Salvadora*]. *Snake Systematics Newsletter* 3:1.

Brandegee, T. S. 1890. A new Nolina. *Zoe* 1(10):305–306.

Brattstrom, B. H. 1968. Laurence M. Klauber, 1883–1968. Honorary Member of the Herpetologists' League. *Herpetologica* 24(3):271–272.

Burns, F. L., compiler. 1915. A Bibliography of Scarce or Out of Print North American Amateur and Trade Periodicals Devoted More or Less to Ornithology. Supplement to *The Oologist* 32(7) [Whole No. 336]:1–32. [The title page of most standard issues carries the umlaut over the second 'o' with the title rendered as *The Oölogist*; the title page of this supplement does not. Digital copies readily available online were scanned from offprints and have no indication of a publisher].

Coan, E. 1966. Charles Russell Orcutt, pioneer Californian malacologist, and *The West American Scientist*. *Transactions of the San Diego Society of Natural History* 14(8):85–96.

Cochran, D. M. 1961. Type specimens of reptiles and amphibians in The U. S. National Museum. *United States National Museum Bulletin* 220. xv, 291 p.

Cooper, J. G. 1870. *Ornithology of California. Vol. I. Land Birds. Edited by S. F. Baird, from the Manuscript and Notes of J. G. Cooper*. Geological Survey of California, Published under Authority of the Legislature. University Press, Cambridge, Massachusetts. xi, 592 p.

Cooper, J. G. 1892. On land and fresh water Mollusca of Lower California. No. 2. *Proceedings of the California Academy of Sciences*, Series 2, 3:207–217.

Diller, J. S. 1908. Strata containing the Jurassic flora of Oregon. *Bulletin of the Geological Society of America* 19:367–402.

Eigenmann, C. H., and R. S. Eigenmann. 1891. *Cottus beldingii*, sp. nov. *The American Naturalist* 25:1132.

Emerson, W. O. 1906. *Oceanodroma leucorhoa* and its relatives on the Pacific Coast. *The Condor* 8:53–55.

Fisher, A. K. 1920. In memoriam: Lyman Belding. *The Auk* 37(1):33–45, Plate 3.

Fisher, W. K. 1918. In memoriam: Lyman Belding. *The Condor – A Magazine of Western Ornithology* 20(2):Frontispiece, 51–61.

Fontaine, W. M. 1905. The Jurassic flora of Douglas County, Oreg. Pp. 48–145, plates 6–37 *in* Status of the Mesozoic Floras of the United States. Second Paper by Lester F. Ward with the Collaboration of William M. Fontaine, Arthur Bibbins, and G. R. Wieland. *Monographs of the United States Geological Survey* 48.

Gill, F., D. Donsker, and P. Rasmussen (eds.). 2020. IOC World Bird List (v.10.2). doi:10.14344/IOC.ML.10.2 (Accessed 13 November, 2020).

Greene, E. L. 1885. Studies in the botany of California and parts adjacent. I. *Bulletin of the California Academy of Sciences* Volume 1 (Bulletin 3):66–177.

Grismer, L. L. 2002. *Amphibians and Reptiles of Baja California Including its Pacific Islands and the Islands in the Sea of Cortés*. University of California Press, Berkeley, California. xiv, 399, [2] p.

Hollingsworth, B. D., and A. M. Bauer. "1999" 2000. The Klauber Herpetological Library at the San Diego Natural History Museum. *International Society for the History and Bibliography of Herpetology Newsletter and Bulletin* 1(2):27–33, 35.

Hovens, P., W. J. Orr., and L. A. Hieb (eds.). 2004. *Travels and Researches in Native North America, 1882–1883. Herman ten Kate.* University of New Mexico Press, Albuquerque, New Mexico. xi, 411 p.

Jepson, W. L. 1929. Charles Russell Orcutt, natural history collector. *Madroño* 1:273–274.

Klauber, L. M. 1956. *Rattlesnakes. Their Habits, Life Histories, and Influence on Mankind. In Two Volumes*. University of California Press, Berkeley, California. xxix, pp. 1–708 / xvii, pp. 709–1476, 3 fold-out tables.

Leviton, A. E., and M. L. Aldrich (eds.). 1997. *Theodore Henry Hittell's The California Academy of Sciences. A Narrative History:1853–1906. Edited, Revised, and Enlarged*. The California Academy of Sciences, San Francisco, California. xv, 623 p.

McCrystal, H. K., and M. J. McCoid. 1986. *Crotalus mitchellii* (Cope). Speckled rattlesnake. *Catalogue of American Amphibians and Reptiles* 388:388.1–388.4.

Merriam, C. H. 1888. Description of a new spermophile from California. *Spermophilus beldingi*, sp. nov. *Annals of the New York Academy of Sciences* 4:317–321.

Necker, W. L. 1943. A herpetological bibliography of Leonhard Stejneger (1851–1943). *Herpetologica* 2(5):87–92.

Noble, E. B. 1942. Memorial. William Warren Orcutt (1869–1942). *Bulletin of the American Association of Petroleum Geologists* 26(7):1306–1308.

Orcutt, C. R., compiler. 1915. *Molluscan World Volume I.* San Diego, California. 62, 208 p.

Reist, K. A. 2018. In Memoriam. Manuel Vincent (Manny/Rube) Rubio. *Sonoran Herpetologist* 31(1):16.

Ridgway, R. 1882. Descriptions of some new North American birds. *Proceedings of the United States National Museum* 5:343–346.

Ridgway, R. 1884. Descriptions of some new North American birds. *Proceedings of the Biological Society of Washington* 2:89–95.

Ridgway, R. 1885. On two hitherto unnamed sparrows from the coast of California. *Proceedings of the United States National Museum* 7(33):516–518. [Published January, 1885; see p. 513].

Ridgway, R. 1919. The Birds of North and Middle America: A Descriptive Catalogue of the Higher Groups, Genera, Species, and Subspecies of Birds Known to Occur in North America, from the Arctic Lands to the Isthmus of Panama the West Indies and Other Islands of the Caribbean Sea, and the Galapagos Archipelago. Part VIII. *Bulletin of the United States National Museum* 50. xvi, 852 p., Plates 1–34.

Rubio, M. 1992. Charles M. Bogert Junio 4, 1908 – Abril 10, 1992. *Boletín de la Sociedad Herpetologica Mexicana* 4(2):29–32.

Rubio, M. 1998. *Rattlesnake. Portrait of a Predator*. Smithsonian Institution Press, Washington, D. C. xxvii, [5], 240 p.

Rubio, M. 2010. *Guide to the Rattlesnakes of the United States & Canada*. ECO Herpetological Publishing & Distribution, Rodeo, New Mexico. 307 p.

Rubio, M., and D. E. Keyler. 2013. *Venomous Snakebite in the Western United States*. ECO Herpetological Publishing & Distribution, Rodeo, New Mexico. 170 p.

Shaw, C. E. 1969. Laurence Monroe Klauber. 1883–1968. *Copeia* 1969(2):417–419.

Stejneger, L. 1891a. *Crotalus pyrrhus* in California. *The West American Scientist* 7(59):165–166.

Stejneger, L. 1891b. *Crotalus pyrrhus* in California. *The Oregon Naturalist* [Eugene, Oregon] 1(4):13–15.

Stejneger, L. 1893. Annotated list of the reptiles and batrachians collected by the Death Valley Expedition in 1891, with descriptions of new species. Pp. 159–228, Plates 1–4 *in* The Death Valley Expedition. A Biological Survey of Parts of California, Nevada, Arizona, and Utah. Part II. *North American Fauna* 7.

Stejneger, L. 1894. Description of a new lizard (*Verticaria beldingi*), from California. *Proceedings of the United States National Museum* 17:17–18.

Stejneger, L. 1895. The poisonous snakes of North America. Pp. 337–487, Plates 1–19 *in* Annual Report of Board of Regents of the Smithsonian Institution, Showing the Operations, Expenditures, and Condition of the Institution for the Year Ending June 30, 1893. *Report of the U. S. National Museum*. Government Printing Office, Washington, D.C.

Ten Kate, H. F. C., Jr. 1885. *Reizen en Onderzoekingen in Noord-Amerika*. E. J. Brill, Leiden, The Netherlands. vii + 464 p., 1 map, 2 plates.

Todd, A. 1890. Correspondence [On a moth collected under electric lights in Eugene, Oregon]. *The West American Scientist* 7(54):60.

Todd, A. 1891. *Ancella*-bearing strata of Oregon. *The West American Scientist* 7(56):83–84.

Uetz, P., J. Hallermann, and J. Hošek (eds.). 2020. The Reptile Database. *Phrynosoma asio* Cope, 1864. (Accessed 16 November, 2020).

Van der Pas, P. W. 1977. In search of the original Californian. Herman ten Kate's expedition to Baja California. *The Journal of San Diego History* 23(3):41–92.

Vieillot, [L. J. P.]. 1818 "1817". Le petrel-puffin fulgineux, *Procellaria leucorhoa*. P. 422 *in Nouveau Dictionnaire d'Histoire Naturelle, Appliquée aux Arts, a l'Agriculture, à l'Économie rurale de domestique, à la Médecine, etc. par un Société de Naturalistes d'Agriculteurs. Nouvelle édition presqu'entièrement refondue et considérablement augmentée; avec des Figures Tirées des Trois Règnes de la Nature.* Tome XXV. Abel Lanoe, Paris, France. [The title page is printed with the date 'M DCCC XVII' but that date is out of sequence and appears to be a printer's error. Volumes 7 through 18 are dated 1817, 19–24 are dated 1818, as are volumes 26–27, and volumes 28–36 are dated 1819].

Yarrow, H. C. 1882a. Description of new species of reptiles and amphibians in the United States National Museum. *Proceedings of the United States National Museum* 5:438–443.

Yarrow, H. C. 1882b. Check List of North American Reptilia and Batrachia, with Catalogue of specimens in the U.S. National Museum. *Bulletin of the United States National Museum* 24. v, [1], 249 p.

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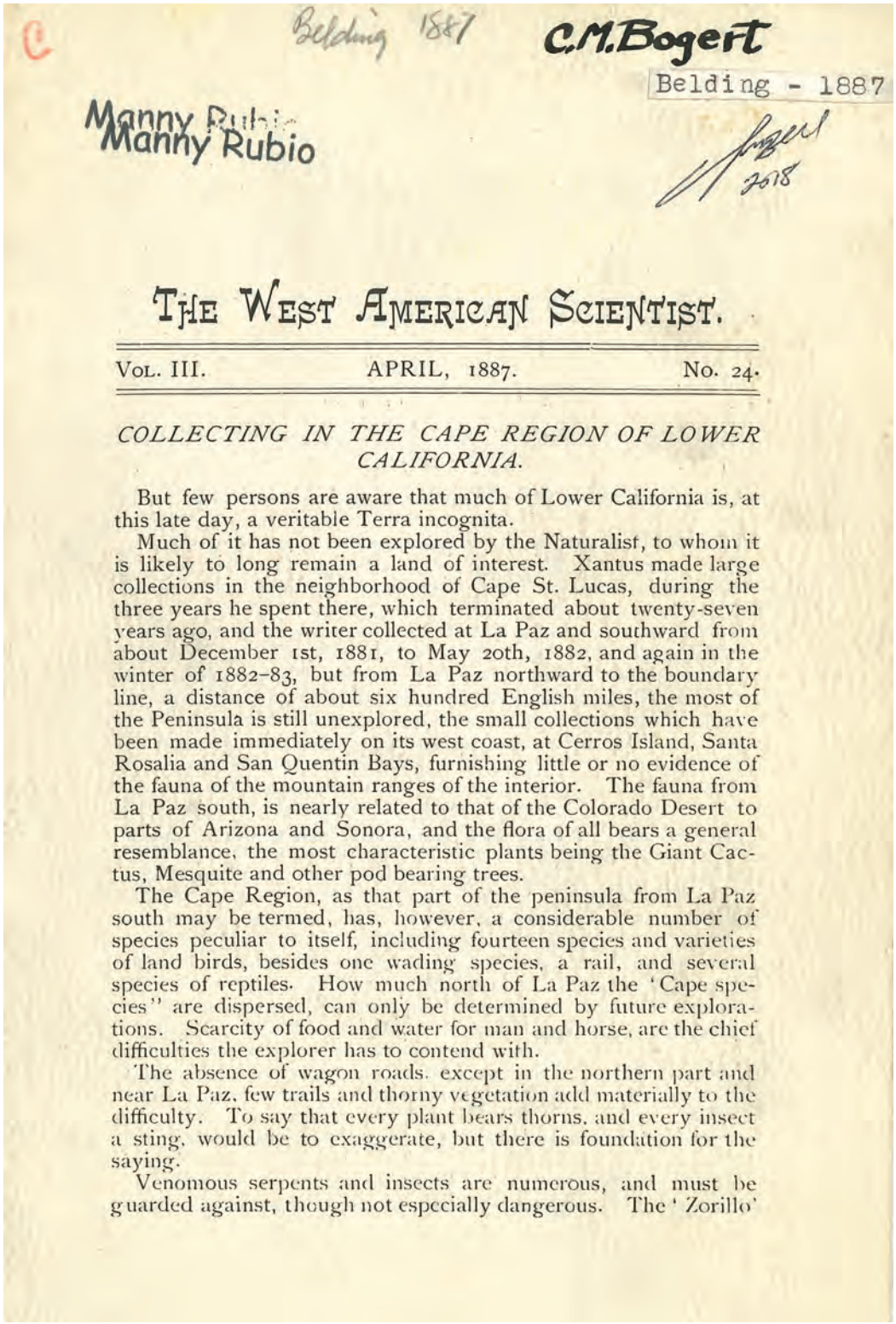
Appendix 1.

Laurence Klauber's 1936 holiday greeting consisting of a reprint of an 1887 edition of *The West American Scientist* containing two articles on herpetological observations by Lyman Belding (Belding, 1887a and 1887b).



Belding 1887 C.M.Bogert

Belding - 1887

Manny Rubio

THE WEST AMERICAN SCIENTIST.

VOL. III. APRIL, 1887. No. 24.

COLLECTING IN THE CAPE REGION OF LOWER CALIFORNIA.

But few persons are aware that much of Lower California is, at this late day, a veritable Terra incognita.

Much of it has not been explored by the Naturalist, to whom it is likely to long remain a land of interest. Xantus made large collections in the neighborhood of Cape St. Lucas, during the three years he spent there, which terminated about twenty-seven years ago, and the writer collected at La Paz and southward from about December 1st, 1881, to May 20th, 1882, and again in the winter of 1882–83, but from La Paz northward to the boundary line, a distance of about six hundred English miles, the most of the Peninsula is still unexplored, the small collections which have been made immediately on its west coast, at Cerros Island, Santa Rosalia and San Quentin Bays, furnishing little or no evidence of the fauna of the mountain ranges of the interior. The fauna from La Paz south, is nearly related to that of the Colorado Desert to parts of Arizona and Sonora, and the flora of all bears a general resemblance, the most characteristic plants being the Giant Cactus, Mesquite and other pod bearing trees.

The Cape Region, as that part of the peninsula from La Paz south may be termed, has, however, a considerable number of species peculiar to itself, including fourteen species and varieties of land birds, besides one wading species, a rail, and several species of reptiles. How much north of La Paz the 'Cape species" are dispersed, can only be determined by future explorations. Scarcity of food and water for man and horse, are the chief difficulties the explorer has to contend with.

The absence of wagon roads, except in the northern part and near La Paz, few trails and thorny vegetation add materially to the difficulty. To say that every plant bears thorns, and every insect a sting, would be to exaggerate, but there is foundation for the saying.

Venomous serpents and insects are numerous, and must be guarded against, though not especially dangerous. The 'Zorillo'

or small skunk, (Mephitis putorius,) is more dreaded by Mexican residents than all the other "vermin," as Father Bægert named them, it having a penchant for biting a sleeping person in the face or other exposed part, and its bite causes hydrophobia or something akin to it. Of this I was for a time skeptical, but I obtained so much testimony, that I became convinced of its truth.

I was told at La Paz, that the bite of the skunk was not harmful north of about latitude 25°.

My greatest misfortune while in Lower California, was that I was stung about a dozen times by the "Allikranz" or scorpion, my greatest annoyance, that caused by the numerous fleas. Cockroaches and ants would persist in getting in my drinking water, especially at San Jose del Cabo, where the fleas were also most troublesome, until I learned to keep the water in bottles.

The Cockroaches were marvels of their kind, being about two inches long and stout in proportion.

Of the ants there were several species, and each was numerously represented.

When camping in the country, I was careful to camp in sandy arroyos, shunning rocky ground for fear of reptiles and the skunk.

The Mexicans usually keep dogs about their camps to protect them from the latter.

Scorpions sometimes dropped from the palm thatched roofs of the dwellings on my bed, and occasionally I would find them in my garments, where they had secreted themselves during the night, but after one painful experience, I examined the garments with due caution every morning, and never neglected to invert my boots and shake them.

The Mexicans were always kindly and hospitably inclined, and when stopping at a strange ranch for a night, I made it a rule to place my gun in charge of the proprietors, and I never had cause to regret the confidence I reposed in them. The Custom officials always accepted my statements as to the contents of my packages, and would politely decline to inspect them.

Professor Baird, the able director of the National Museum and Smithsonian Institution, for which I was collecting, advised me to pay special attention to the reptiles of Lower California, informing me that Xantus found many interesting species, among which were two very interesting species of rattlesnakes, and that I too would be likely to discover new ones. With appropriate zeal, I endeavored to follow his advice, and was fairly rewarded for my efforts, though collecting and caring for the specimens was anything but pleasant, and an uncertain degree of danger was involved in it.

Fortunately, when I arrived at La Paz in December, the Messrs. Gaston Brothers were having new ground, about three miles west of La Paz, spaded for a garden, and upon learning that their laborers often unearthed hibernating reptiles of various kinds, I lost

no time in contracting with the laborers for a general assortment of reptiles, scorpions, centipedes, tarantulas, etc. About half of the species I got from La Paz, came from that garden of two or three acres, and among these was a lizard, an individual, which Dr. Yarrow described under the name of Crotaphytus copei, and which is the only specimen of its kind, as I did not find it elsewhere. The reptile crop of that garden was prodigous, though I took only a small part of it, as I wanted only a few individuals of each species.

Probably it was about an average yield for that part of the peninsula. One day while at the garden, I lay down by the side of the cabin to rest, using a saddle that lay there for a pillow. After sleeping a few minutes, I arose, and soon after found a large Diamond rattlesnake coiled beneath it. I was not greatly startled by the discovery as I had previously been on more than a dozen occasions, within the striking distance of rattlesnakes, without their attempting to harm me. Mayor Pond, of San Francisco, had about such an experience as the above, when we were fishing on the Stanislaus River, a few years ago, except that his pillow was a trout basket, and his snake did not remain until he finished his sleep.

Our revolutionary forefathers were evidently acquainted with this reptile, as they placed the figure of one on their flag with the motto, "don't tread on me or I will bite" Rarely, however, an individual will behave in an unaccountable manner. One that I met with in the mountains of Pennsylvania, when a boy, has been a life long puzzle to me, and I have never been able to decide if it was trying to "charm" me or if I charmed it As I shot its head off and dimmed its piercing, glistening eyes forever, after it had steadily, slowly and silently approached to within three feet of me, its impulses can never be known. Perhaps it was a "crank." I use the word crank with much hesitation, for since the death of the criminal Guiteau, I have heard it used in various connections.

A single example will sufficiently explain why I hesitate to apply the name to a dead rattlesnake. When I was in Sierra Valley, in the summer of 1885, I enquired about a distinguished botanist, of whom I had often heard but had never met, and a lumberman said he was a crank, giving as a reason for the assertion, that "he did nothing but go about the mountains gathering weeds." This man was like a few more of our enterprising people, who think the chief object of life is to gather dollars and cents, and surround themselves with "gew gaws." (A friend who resides in this town, tells me "a great many people in San Diego have the Natural History Craze.")

Besides the specimens obtained in the garden, I increased the number of species by visiting all sorts of places, and by the middle of March, I was happy in the belief that I had nearly duplicated

Xantus' notable collection of reptiles and birds, besides adding a few new species; but I was most pleased to know that I had ascertained that the "Cape Species" were by no means confined to the Cape, and this accorded with my belief, based upon my first critical survey of this part of the peninsula from a steamer's deck. I brought Uta thalassina from Cliffs near Playitas, Sauromalus ater from Espiritu Santa Island, Sceloporus rufidorsum from igneus rocks, east of La Paz, and the new toad was first found in a well at Infirmaria Bay.

I was alone when I went to the bottom of the well, as my boatmen were on the bay diving for the beautiful but frail Coral found in Infirmaria Bay, and I was somewhat nervous when I descended the well, as I might need help in getting out, and if I could not get out I might never be found; but after a careful survey, I rightly conjectured that I could safely descend. Some of the specimens I carried in my saddle pockets and fish basket, at least three days before putting them in alcohol, but I was careful to inject a little preservative which was usually a solution of Chloride of Zinc. A few specimens I got at Laguna, in the Victoria Mountains, were thus preserved, rolled up in cotton and forwarded to Washington for identification, and I suppose they reached their destination in fair order, as I never heard to the contrary. I kept the most of the alcoholic specimens in large Mason fruit jars, next to the wall of my only room, where I saw them early and late, and often examined them to see if they were doing well. Handling the specimens before breakfast, as I invariably did, did not increase my appetite for it, and a repetition of the same just before retiring at night was not conducive to pleasant dreams, but lest I weary the reader with too much detail, I will say briefly, I went from La Paz to Cape St. Lucas, San Jose del Cabo and other localities, and added a few species to those already collected, as the San Jose River supplied several not found elsewhere.

This is the only river south of La Paz, and it is so small in winter, in the dry season, that it hardly deserves the name of river. In summer, the wet season, it is much increased in volume, as I judged from traces of its deposits of drift. The wear and waste of the granite rock is apparently very rapid in Southern Lower California, as the canyons are full of granite sand, and much of the surface of the country is covered with it.

While I was travelling alone across the peninsula. from the Pacific Ocean to La Paz, in 1883, I saw enough to convince me that the portion of the peninsula from La Paz south had, until a comparitively recent date, been an island.

This would in part account for the origin of the "Cape Species." The distribution of species, and especially of fossils, will ever be of great interest to the Naturalist.

The distribution of reptiles is much more significant of geological changes than that of birds and animals, and we may reason-

ably conclude, because the reptiles of the Coronados, and most other Pacific Coast Islands, are similar to those of adjacent parts of themain land, that these islands were formerly connected with and were a part of the main land, though we cannot be positive that such was the fact.

A comparison of the reptiles of the southern and northwestern portions of the peninsula, shows great difference in genera and species, though a few are common to both.

Some of the birds of the Cape region should be found between San Diego and La Paz, while others are probably but local. Certainly, the peninsula presents rare opportunities for the energetic, intelligent explorer. *L. Belding,*

SAN DIEGO, March 20, 1887.

REPTILES OF THE CAPE REGION OF LOWER CALIFORNIA.

The following is a list of the reptiles I collected in Lower California, the majority of which were also found by Xantus. My specimens were identified by Dr. H. C. Yarrow, Honorary Curator of the department of reptiles in the United States National Museum:

1. Pseudemys ornata, Gray. Found only in the San Jose River.

2. Chirotes canaliculatus, Cuvier. Said by the Mexicans to be dangerous. I doubt their absurd tales concerning this.

3. Cnemidophorus maximus. Cope. "Verico," "Axotle" of the Mexicans of Lower California.

4. Verticaria hyperythra, Cope.

5. Gerrhonotus multicarinatus. Baird and Girard.

I found this in the south only above 3,500 feet altitude. Also on the Coronado Islands.

6. Calisaurus dracontoides, dracontoides (Blainv), Cope. *Cachura de la arena* or "Sand Lizard." I found this also at Real del Castilla, in the northern part of the peninsula, 95 miles south-east of San Diego.

7. Sauromatus ater, Dumeril. Only found by me at Espiritu Santo Island and at Guaymas. Dr. Streets (Bull. U. S. Nat. Mus. No. 7) found it on Angel Island, several hundred miles north of Espiritu Santo. It will probably be found on the Gulf Coast of the peninsula north, if not also south of La Paz. though the Aborignal tribes may have planted them on these islands after obtaining them in Sonora or Arizona.

8. Crotaphytus Copei, Yarrow. A new species.

9. Dipsosaurus dorsalis, Baird and Girard. *Cachuron,* of the Mexicans. Small lizards are called *Cachuras* or *Cachuritas.*

10. Uta thalassina, Cope. On cliffs near fresh water in several localities, at Playitas, San Lazaro and in Victoria Mountains The *Cachura verde* or "Green Lizard" of Lower Californians.
11. Uta nigricauda, Cope.
12. Uta schotti, Baird.
13. Uta elegans, Yarrow—a new species.
14. Uta ornata, Baird and Girard.
15. Uta stansburiana, Baird and Girard. Also on Cerros Island.
16. Sceloporus rufidorsum, Yarrow. A new species. In life it is highly colored, the back having coppery-red metalic reflections instead of rufous. It fades in alcohol. The Mexicans' name for the Sceloporæ is *Vijore*, (pronounced ve-ho-re)
17. Sceloporus clarki zosteromus, (B. and G.), Cope.
18. Sceloporus consobrinus, Baird and Girard.
19. Phrynosoma cornutum, Harlan. Horned Lizard; two species.
20. Phrynosoma asio, Cope.
21. Cyclura hemilopha, Cope. This and the two following called *Iguana*, without distinction.
22. Cyclura teres, Harlan.
23. Cyclura acanthura, Shaw.
24. Phyllodactylus xanti, Cope. This and the following species are known by the name Zalamanquesa. The Lower Californians say that they are very poisonous; that if they crawl on one's flesh it decays. They often frequent dwellings.
25. Diplodactylus unctus, Cope.
26. Crotalus mitcheli, Cope. Apparently very rare, as is also the following species; neither as yet found north of La Paz. Both good species. *Vivore con cascabel* is here the Mexican name for the rattle-snake.
27. Crotalus enyo, Cope.
28. Crotalus adamanteus atrox (Beauvois) Cope. Very abundant.
29. Chilomeniscus stramineus, Cope.
30. Chilomeniscus cinctus, Cope.
31. Ophibolus getulus boyli (Linn), Cope.
32. Hypsiglena ochrorhyncha, Cope.
33. Trimorphodon lyrophanes, Cope.
34. Phimothyra grahami, Baird and Girard.
35. Phimothyra decurtata, Cope.
36. Pityophis vertebralis, Blainville. Mexican name *Coralillo* (pronounced Coral-e-yo.)
37. Bascanium flagelliforme testaceum (Catesby), Cope.
38. Tropidonotus validus tephropleura (Kennicott), Yarrow.
39. Lichanura trivirgata, Cope.
40. Stenostoma humile, Baird and Girard.

41. Bufo punctatus, Baird.
42. Bufo beldingi, Yarrow. New species.
43. Hyla curta, Cope.
44. Hyla regilla, Baird.
45. Scaphiopus couchi, Baird.

To these should be added the following which were collected by Xantus (Yarrow Bull. Nat. Mus. 24):

46. Eumeses skiltonianus, Baird and Girard.
47. Bascanium aurigulum, Cope.
48. Tropidonotus validus validus (Kennicott), Cope.
49. Tropidonotus validus celæno (Kennicott), Cope.
50. Eutænia cyrtopsis, Kennicott and
51. Phrynosoma coronatum, Blainville, by J. H. Clark.
52. I saw at Guaymas a Leather-back Turtle (Dermatochelys) which weighed 1,102 lbs. I noticed other marine species in the Gulf not here mentioned, and also three species of water-snakes in or near the San Jose River which I did not collect.

I found in the Spring of 1881 at Cerros Island and San Quentin Bay, besides other species already mentioned—

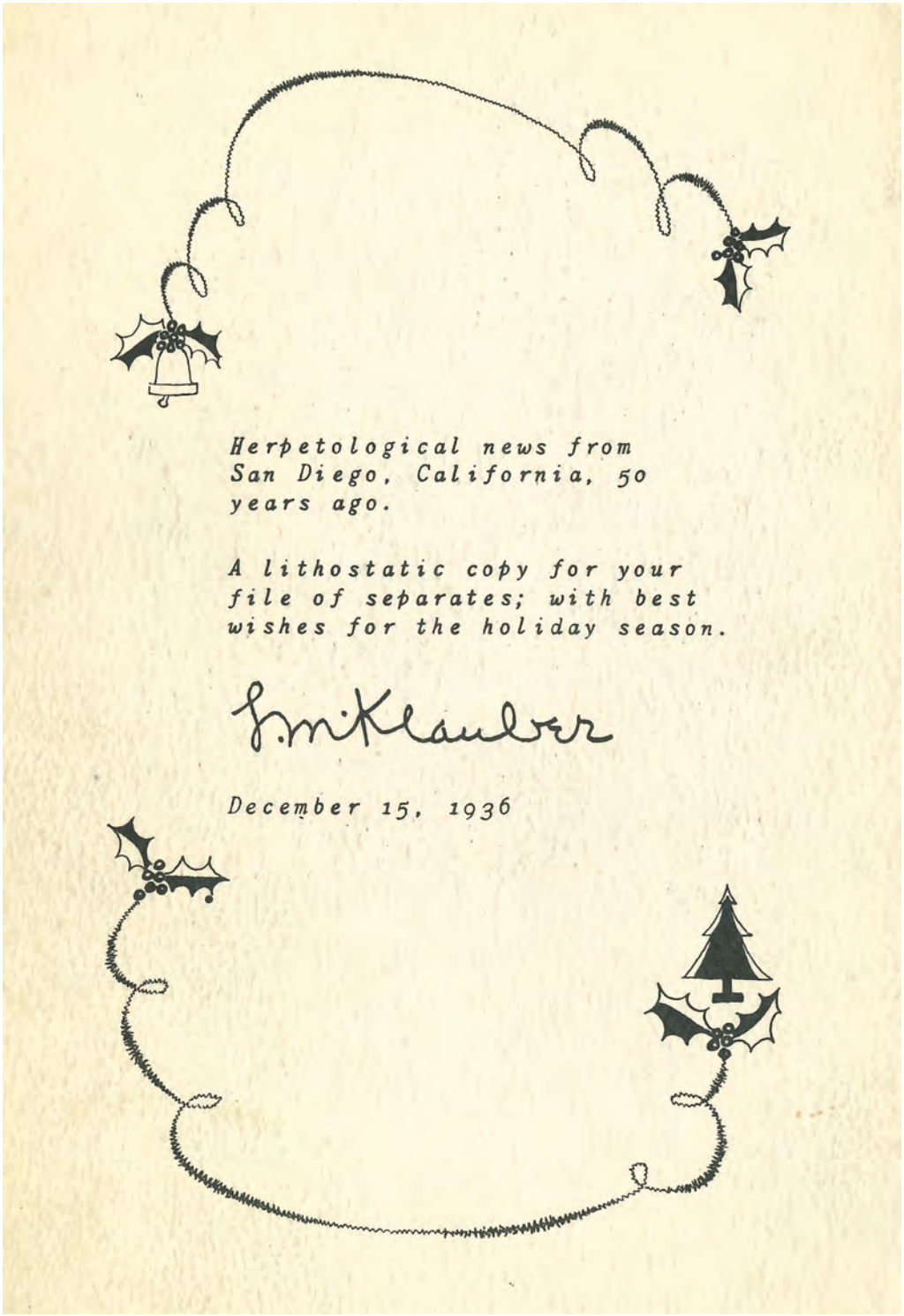
52. Cnemridophorus tessellatus melanostethus (Say), Copee.
53. Sceloporus clarki clarki (Baird and Girard), Cope.
54. Phrynosoma hernandezi, Girard.

Dr. Yarrow, Bull. 24, mentions other species of Lower California reptiles as being among the desiderata of the National Museum, namely, Tantilla planiceps, Blainville. Ophibolus Californiæ, Blainville. Eutænia cyrtopsis ocellatus (Kennicott), Cope. Charina bottæ, [Found in San Diego County, south. ED. WEST AMERICAN SCIENTIST.] Plethodon croceator, Cope. Scaphiophus varius rectifrenis, Cope.

No. 33 is said by Mexicans to be very poisonous, as it often enters dwellings, getting on and in beds. It is much feared. I believe Dr. Yarrow told me that it is harmless.

No. 43 I found at San Quentin Bay and on Cerros Island, but it was only in the mountains in the Cape Region.

L. Belding.


Herpetological news from
San Diego, California, 50
years ago.
A lithostatic copy for your
file of separates; with best
wishes for the holiday season.
L. M. Klauber
December 15, 1936

Appendix 2.

In the early 1890s two separate serial publications appeared under the title *The Oregon Naturalist*. One of those was first published in February 1891 in Eugene, Oregon (Fig. 4) and persisted through October of that year, with a total run of only seven issues (https://babel.hathitrust.org/cgi/pt?id=mdp.39015061961895&view=1up&seq=9). The publisher listed for all seven issues was Aurelius Todd, who described himself in the advertisement pages of the journal as a "taxidermist" and, based upon his ads, clearly also was a purveyor of natural history objects such as shells, eggs, and skins. We found two men of this name who were in Oregon at the appropriate time. One (Aurelius Abbott Todd) is reported to have been born on 30 December 1856 or 1857 in Lookingglass, Oregon, died on 29 September 1929 (https://www.findagrave.com/memorial/36191697/aurelius-abbott-todd) and was apparently a dentist (based on a search of early Oregonians in the Oregon State Archives). A second Aurelius Todd was listed in the 1880 United States Federal Census as a resident of Calapooia, Oregon, where his occupation was given as 'peddler.' We are not sure which (if either) was editor of *The Oregon Naturalist*. We are reasonably certain that the editor also authored two papers in *The West American Scientist* (Todd, 1890, 1891), in one of which he provided the discovery and first report of fossil plants in Douglas County, Oregon that launched major investigations into the paleobotany of the region (Fontaine, 1905; Diller, 1908).

Charles Orcutt clearly was associated with the publication of the Eugene version of *The Oregon Naturalist*. Beginning with the third issue, and on issues 4, 5, and 7, the title page carried an annotation that 'Editorial Rooms' were in Orcutt, California, with an adjacent annotation of "Orcutt News Co., Redlands, California." Issue 6 said simply "Orcutt, California." The town probably was named for oil geologist William Warren Orcutt (14 February 1869–27 April 1942; Noble, 1942); we are unsure of the Orcutt News Company. Charles Orcutt posted a few advertisements in the classified pages of the first four issues, but in issue number 5 he posted eight separate classified ads. They were: (1) an offer to sell for $12 the two-volume set of *Botany of California*; (2) an offer to sell for $3 the 575 p. *California Fruits and How to Grow Them* by Edward J. Wickson; (3) "C. R. Orcutt, Scientific Books, San Diego California"; (4) an offer to sell for 20 cents the 32 p. booklet *California Trees and Flowers*; (5) "Good chance for man or woman, at own home, to engage in profitable business. Small capital required; fair education needed. Address, with references, C. R. Orcutt, San Diego., Cal."; (6) "Books wanted in exchange for seeds and plants. C. R. Orcutt, Orcutt, Cal."; (7) "Orcutt Seed and Plant Co., San Diego, Cal, offer choice novelties, especially in Cacti, wholesale and retail"; and (8) "Twelve varieties of California Wild Flower seeds, 50 cents. Orcutt Seed and Plant Co., San Diego, Cal." In issue 6, Orcutt had five full-page ads, including price lists for plants and shells, and one to advertise the book *California Trees and Flowers*.

Orcutt's obvious association led us to look more closely at the contents of *The Oregon Naturalist* [Eugene, Oregon]. We immediately noticed Leonhard Stejneger's paper entitled '*Crotalus pyrrhus in California* '(Stejneger, 1891b), which is a verbatim reprint of a paper of the same title in volume 7 [whole number 59] of *The West American Scientist* (Stejneger, 1891a[3])! That discovery led to the realization that the contents of *The Oregon Naturalist* [Eugene, Oregon] are entirely reproduced, with different pagination, from the pages of *The West American Scientist*. The correspondence between issues is laid out in Table 2. That history of reprinted titles probably is not widely known. A bibliography of herpetological publications by Stejneger (Necker, 1943) included a citation to the paper on *Crotalus pyrrhus* published in *The West American Scientist*, but not the version that appeared in *The Oregon Naturalist*. It is possible that Stejneger himself was unaware of the duplication; he cited only the original in his review of venomous snakes of North America (Stejneger, 1895). Even Laurence Klauber, who launched our current efforts by circulating two papers from *The*

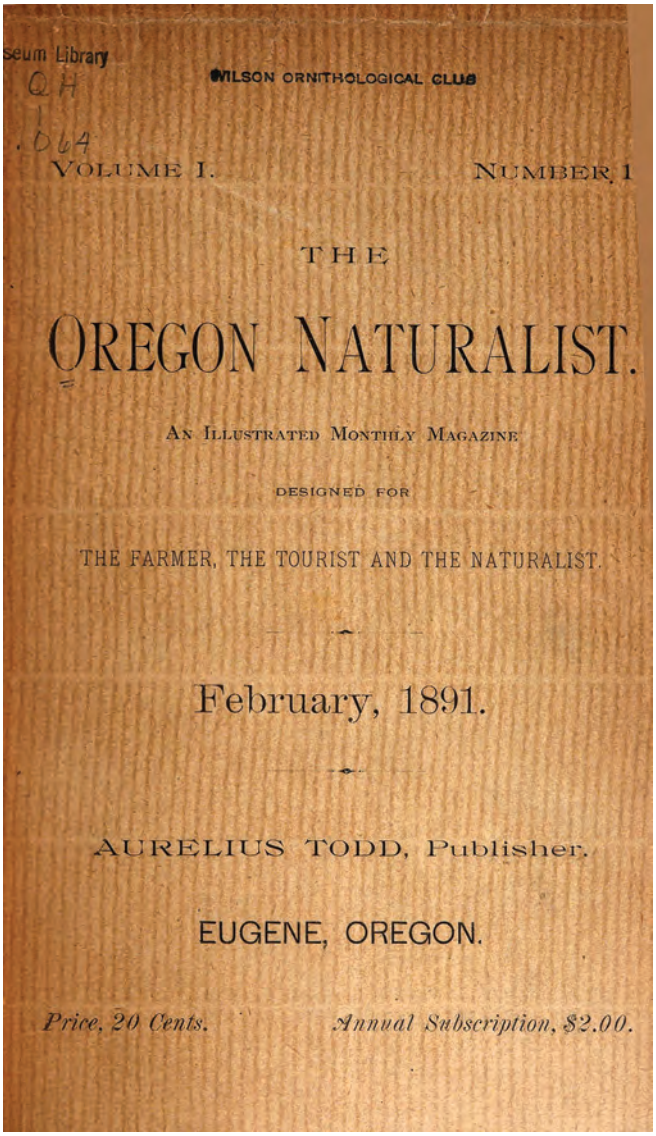


Fig. 4. Cover to volume 1, number 1 of *The Oregon Naturalist* [Eugene, Oregon] from February, 1891. Only seven issues of the journal were published, all in 1891. The contents of all issues were reprinted from *The West American Scientist*.

[3] In this paper Stejneger reported two specimens collected by Charles Orcutt (the first specimens from the U. S. state of California) and compared them to a specimen collected by Lyman Belding in La Paz, Baja California, Mexico!

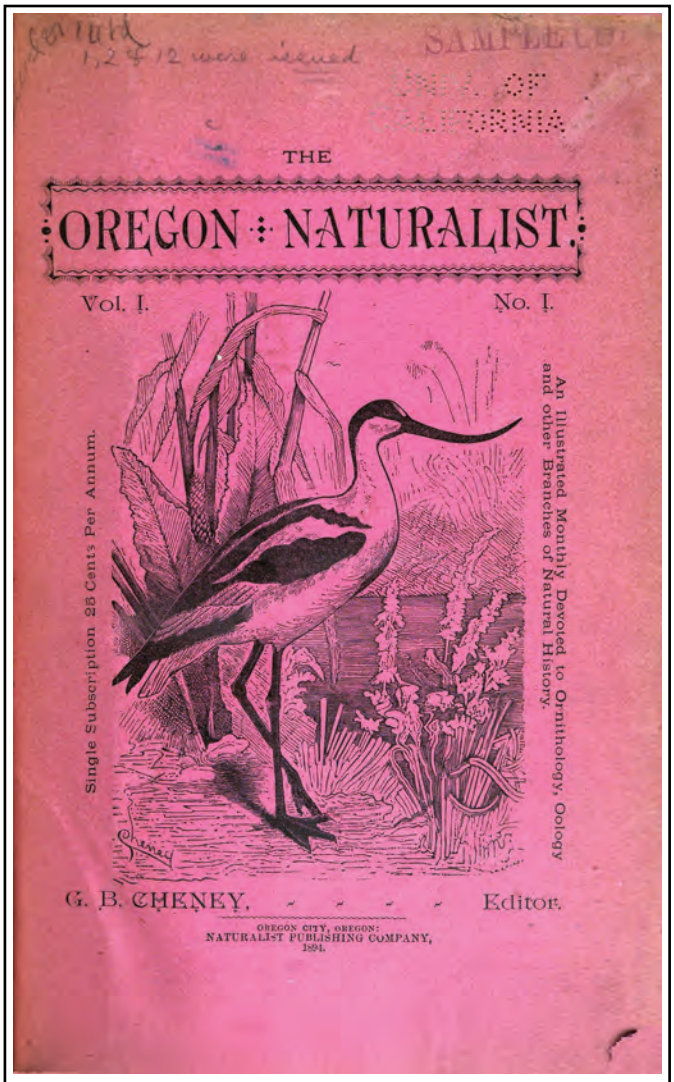

THE
OREGON NATURALIST.
Vol. I.
No. I.
Single Subscription 25 Cents Per Annum.
An Illustrated Monthly Devoted to Ornithology, Oology and other Branches of Natural History.
G. B. CHENEY, - - - - - Editor.
OREGON CITY, OREGON:
NATURALIST PUBLISHING COMPANY,
1894.

Fig. 5. Cover to volume 1, number 1 of *The Oregon Naturalist* [Oregon City, Oregon] from September, 1894. This publication merged with and adopted the title of *The Naturalist* from Austin, Texas in December, 1894. In February, 1895 the title reverted to *The Oregon Naturalist*. Publication ceased in 1898.

West American Scientist, did not cite the version from *The Oregon Naturalist* in his two-volume monograph on rattlesnakes (Klauber, 1956); interestingly he also did not cite the original version. Neither version was cited in the *Catalogue of American Amphibians and Reptiles* account on *Crotalus mitchellii* (McCrystal and McCoid, 1986), although that may be related to the printed page constraints imposed on authors at the time.

A similar case of duplicated publication was noted by Coan (1966), who pointed out that several issues of Orcutt's journal *West American Mollusca* were reprinted from issues of *The West American Scientist* and that volume 1 of Orcutt's *Molluscan World* (Orcutt, 1915) was reprinted from volume 20 (whole numbers 140–157) of *The West American Scientist*; volume 2 of *Molluscan World* was never finished, but completed portions appeared as volume 21 of *The West American Scientist* in 1919.

The second version of *The Oregon Naturalist* (https://babel.hathitrust.org/cgi/pt?id=uc1.b4150794&view=1up&seq=7) has a complicated publishing history (Table 3; see also Burns, 1915:16, 22–23). It began as a serial publication entitled *The Naturalist* (https://babel.hathitrust.org/cgi/pt?id=mdp.39015061888577&view=1up&seq=13) and was published in Austin, Texas beginning in January 1894. Issues 1 through 8–9 of volume 1 were published there from January through September 1894. It then moved to Oregon City, Oregon where G. B. Cheney was already publishing *The Oregon Naturalist*. Volume 1(1) of *The Oregon Naturalist* was published in September 1894 (Fig. 5)—the same month as the final issue of *The Naturalist* in Austin. Volume 1(2) was published in October of 1894, presumably under the title *The Oregon Naturalist* (Burns, 1915), although we were not able to see a copy of that issue. The next issue was numbered as volume 1 number 12 and was published in December of 1894 under the title *The Naturalist*. The issues 1(10) and 1(11) of *The Naturalist* were never published. On page 16 of that December issue is a notice of 'Consolidation' in which Herbert Sterzing, editor of *The Naturalist* in Austin noted that he had transferred all materials of the Austin periodical to G. B. Cheney, "editor of the Oregon Naturalist." That announcement is followed by a statement by Cheney headed "TO OUR READERS" in which he indicated that "With this issue the *Oregon Naturalist* consolidates with The Naturalist, of Austin, Texas, which will be hereafter published here and called The Naturalist as heretofore." Volume 2(1) of *The Naturalist* was published in Oregon City, Oregon in January 1895 with Cheney as Editor. The next issue,

Table 2. Issue correspondence between volume 7 (whole numbers 56–63) of *The West American Scientist* and volume 1 (numbers 1–7) of *The Oregon Naturalist* [Eugene, Oregon]. The contents of each issue of *The West American Scientist* were reproduced in their entirety in the corresponding issue of *The Oregon Naturalist*; only the date of publication, pagination and advertisements differed. Note that whole numbers 59 and 60 of *The West American Scientist* both were reproduced in a single issue of *The Oregon Naturalist*. *The title page of the October 1891 issue *The Oregon Naturalist* is labeled as "Volume II Number 7."

The West American Scientist	***The Oregon Naturalist* [Eugene, Oregon]**
Volume 7, Whole No. 56 (January 1891)	Volume 1, No. 1 (February 1891)
Volume 7, Whole No. 57 (February 1891)	Volume 1, No. 2 (March 1891)
Volume 7, Whole No. 58 (March 1891)	Volume 1, No. 3 (April & May 1891)
Volume 7, Whole No. 59 (April 1891)	Volume 1, No. 4 (July 1891) (first half)
Volume 7, Whole No. 60 (May 1891)	Volume 1, No. 4 (July 1891) (second half)
Volume 7, Whole No. 61 (August 1891)	Volume 1, No. 5 (August 1891)
Volume 7, Whole No. 62 (September 1891)	Volume 1, No. 6 (September 1891)
Volume 7, Whole No. 63 (October 1891)	Volume 2, No. 7 (October 1891)*

volume 2 number 2 was published in Portland, Oregon in February 1895 under the title *The Oregon Naturalist*, and under a new editor. On page 28 of that issue A. B. Averill is listed as the editor, with a note that he purchased the publication from Cheney and that "hereafter it will be known as The Oregon Naturalist." Issues 3 through 12 of volume 2 were published in 1895 under that title, and volume 3(1–10) appeared in 1896. The publication then moved to Palestine, Oregon from where issues 11 and 12 of volume 3 were published. The fourth and final volume under the title *The Oregon Naturalist* was published in Palestine, Oregon; volume 4(1–8) in 1897 and 4(9) in 1898.

Table 3. Summary of the publication history of The Naturalist (1894, Austin, Texas) and The Oregon Naturalist (1894-1898, Oregon City/Portland/Palestine, Oregon). Volume 1(10) and 1(11) of The Naturalist were never published. * = Not seen.

	Independent Journals	
The Naturalist (Austin, TX)		**The Oregon Naturalist (Oregon City, OR)**
1894 vol. 1(1) Jan.		
1894 vol. 1(2) Feb.		
1894 vol. 1(3) Mar.		
1894 vol. 1(4) Apr.		
1894 vol. 1(5) May		
1894 vol. 1(6) Jun.		
1894 vol. 1(7) Jul.		
1894 vol. 1(8-9) Aug. Sept.		1894 vol. 1(1) Sept.
		1894 vol. 1(2) Oct.*
	Combined Journal	
	The Naturalist (Oregon City, OR)	
	1894 vol. 1(12) Dec.	
	1895 vol. 2(1) Jan.	
	The Oregon Naturalist (Portland, OR)	
	1895 vol. 2(2) Feb. to 1896 vol. 3(10) Oct.	
	The Oregon Naturalist (Palestine, OR)	
	1896 vol. 3(11) Nov. to 1898 vol. 4(9) Jan.	

International Society for the History and Bibliography of Herpetology

Bibliotheca Herpetologica

Book Review

Great Adaptations: Star-nosed Moles, Electric Eels & Other Tales of Evolution's Mysteries Solved

Kenneth Catania, 2020. Princeton University Press, viii, 199 p., 8 plates.
$27.95 (hardcover ISBN: 9780691195254)

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Kenneth Catania's opening paragraph, explaining why he loves being a scientist, sets the stage for his marvelous book. He recalls the first scene in *The Princess Bride* when Grandfather is about to read a book to his sick grandson and the skeptical boy asks "Has it got any sports in it?" Grandfather replies, "Are you kidding? Fencing, fighting, torture, revenge, giants, monsters, chases, escapes, true love, miracles." Catania tells us that he might say the same about the biology covered in his book—except for true love and miracles. He is a scientist, after all. Catania has spent thousands of hours studying the brains and behaviors of unusual animals and offers us a vivid account of his discoveries and the background behind those discoveries. He states that he aims to showcase some great performances and hopes the reader will learn about the process of discovery. He also hopes the reader will come away convinced that "Nature is far more interesting than we imagine—and something to be treasured." Catania has succeeded in all three goals, enlightening and entertaining the reader with his remarkable stories.

Catania's passion for solving unsolved biological mysteries and examining extreme adaptations began as an undergraduate at the University of Maryland when he accepted a volunteer job working at the National Zoo in Washington, D. C. His job was caring for and helping to conduct research on the enigmatic Star-nosed Mole. Later, he entered the neuroscience program at the University of California at San Diego thinking about investigating electroreception for his dissertation research. But he could not stop thinking about the function of the enigmatic star at the end of the mole's nose. Catania switched gears and focused on the star. And ever since, he has studied the amazing adaptations of some of Earth's most unusual animals. Although this book features only one reptile (Tentacled Snake, *Erpeton tentaculatus*) and no amphibians, I predict that any herpetologist broadly interested in nature and in science will find this book an intriguing read.

The great performances featured in Catania's book, in addition to the Star-nosed Mole and Tentacled Snakes, include worm grunting (earthworms and moles), Water Shrews, Electric Eels, and Emerald Jewel Wasps and their cockroach victims. Catania's writing is so engaging—full of humor, vivid descriptions, and fascinating information—that every paragraph is a joy to read. As a P.S. at the end of the Introduction chapter, Catania writes: "I'm going to describe some things that seem (at least to me) extraordinary. If you'd like to judge for yourself, then when you see a QR code in the book, use the camera in your smart phone to scan it, and it will take you to a movie showing the animals in action." And what great visuals these are!

The first two chapters tell the story of Catania's investigations of the Star-nosed Mole, *Condylura cristata*. Catania likens this creature to Winston Churchill's famous words to describe the inscrutable inner workings of the Russian government in 1939: "a riddle, wrapped in a mystery, inside an enigma." What is the function of the star? Catania found no olfactory receptors on the star; the star is not used for sense of smell. There are no muscles in the star; it is not used like a hand to pick things up or move them around. And the star lacks electroreceptors, taste buds, or any known chemical detector. Catania turned his attention to the Eimer's organs covering each of the 22 appendages on the star and found that the organs are touch receptors *par excellence*. For reference, a typical human hand has about 17,000 touch nerve fibers. The star has six times that number, concentrated into an area the size of one human fingertip. But Catania did not stop there. He studied the mole's brain, embryonic development of the star, and foraging behavior and efficiency. His research with these remarkable animals continues.

The third chapter focuses on Tentacled Snakes and their deceptive hunting strategy. Tentacled Snakes are found in Thailand, Cambodia, and South Vietnam. They are often called "fishing snakes," because they are completely aquatic

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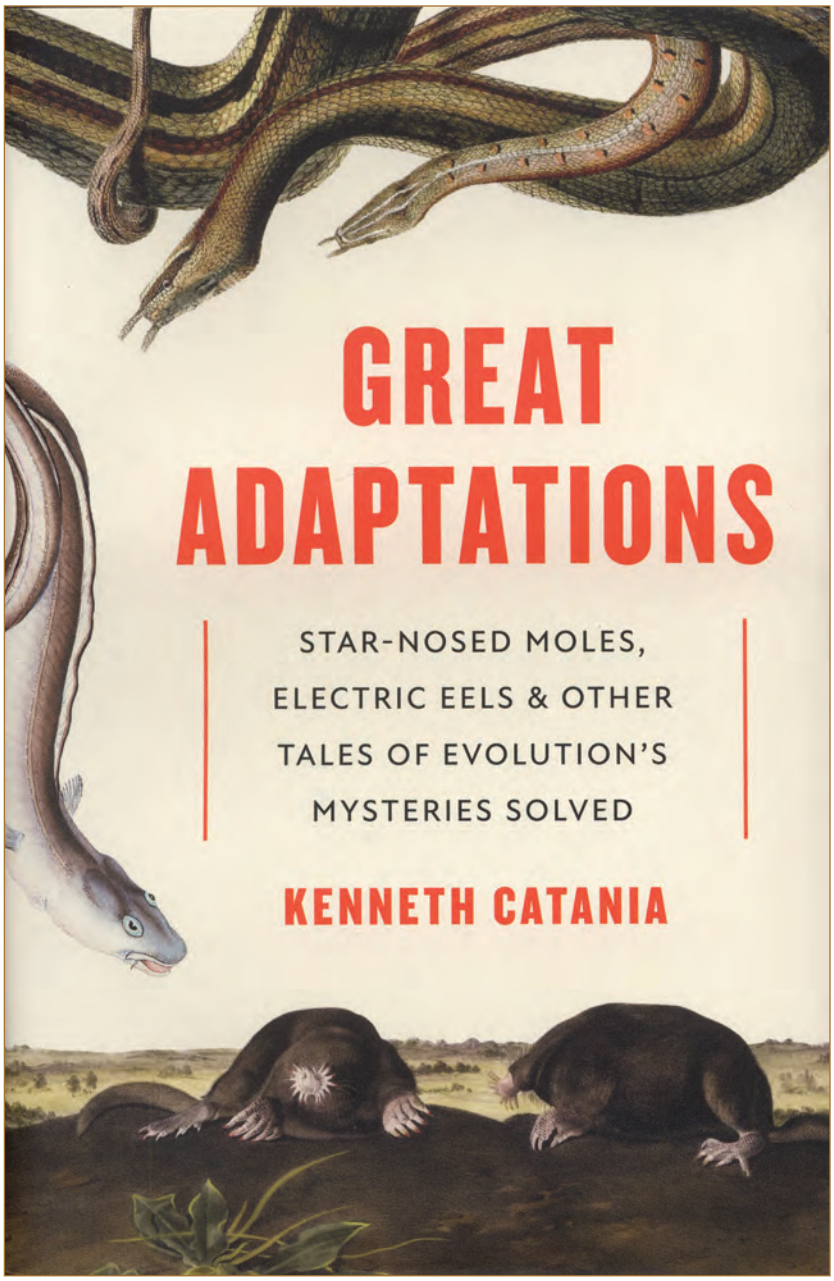
and eat only fish. When a live fish is in sight, a Tentacled Snake assumes a hunting posture of head and neck bent into a J-shape. The snake waits motionless until a fish swims straight into the snake's mouth. So what's the deal with these seemingly suicidal fish? And what is the function of the scaly tentacles on the front of the head? Catania writes that he followed his strategy of studying Star-nosed Moles: "approach the problem with an open mind, gather every possible clue, and start eliminating suspects." I'll leave it to the reader to experience Catania's process of discovery. I will say, however, that Catania was, in his words, "gobsmacked" by the results.



The fourth chapter is the mystery of worm grunting (also called worm charming, worm fiddling, or worm snoring), a wonderful mixture of biology, history, and culture. Niko Tinbergen (1960) described a strange foot paddling behavior that seagulls do on the ground, which causes earthworms to emerge. Jack Kaufmann (1986) reported that Wood Turtles in Pennsylvania stomp their front feet and eat the earthworms that emerge from underground. And so it is not surprising that people have figured out how to encourage earthworms to surface. The basic technique is to pound a stake into the ground and then rub it with a flat piece of iron. As the stake vibrates, earthworms emerge, sometimes by the hundreds, and the "worm grunter" fills cans with the squirming critters. This bait-collecting technique can be lucrative and is the focus of the Sopchoppy (Florida) annual Worm Gruntin' Festival. Why do earthworms emerge in response to vibrations in the soil? In 1881, Darwin wrote in his last book, *The Formation of Vegetable Mould through the Action of Worms with Observations on Their Habits*: "It has often been said that if the ground is beaten or otherwise made to tremble, worms believe they are pursued by a mole and leave their burrows." Catania teamed up with worm grunters in Florida and set to work to test Darwin's supposition, focusing on the Common Mole, *Scalopus aquaticus,* and the native species of earthworm *Diplocardia mississippiensis*. Darwin was correct. It seems that although it's risky for a worm to emerge onto the surface, the alternative is almost certain death in the jaws of a mole. Catania points out that designing and conducting experiments is only half the detective work in science; the other half is reading the literature to find more connections and supporting clues. The puzzle is never really finished. To continue the story, Catania asked: How does the Common Mole find worms? The answer: Moles use stereo olfaction plus a serial sniffing strategy.

The fifth chapter, "Tiny T-Rex," is the story of Catania's research into the question: How does the American Water Shrew, *Sorex palustris,* capture fish? The process of discovery in answering this question is intriguing. Catania is incredibly imaginative and talented when it comes to constructing gadgets to measure what he wants to measure. For example, in the absence of a commercially available Water Shrew whisker stimulator, Catania made a computer-controlled hydraulic system that delivered sudden water pulses, similar in duration to the wake generated by a fish. To test if the shrews can use their whiskers to identify stationary objects from their shape and texture (comparable to what mice and rats can do), Catania made fake fish and other silicon objects. There is an abundance of humor in the chapter, as in "I can't help

but imagine a fish caution sign: 'in case of water shrew attack, don't run.'" The chapter ends with Catania speculating that the Jurassic mammals, with their warm-blooded engines and small networks of cortical areas, may well have been the Ferrari of their times, rather than Model T Fords as they have often been described.

The sixth chapter of Catania's book, focusing on Electric Eels (*Electrophorus electricus*), was of special interest to me because I have experienced the power of the eel. During the summer of 1968, I had just finished my undergraduate degree and was part of a team surveying amphibians and reptiles in the upper Amazon Basin in Ecuador. I was searching for tadpoles in a swamp, when through the muck and vegetation in my long-handled dip net I saw a large wriggling body. I grabbed hold of what I hoped was a Surinam toad. Baam! I lost my balance and fell backward into the water. I had grabbed an electric eel. Catania did some experiments and found that only 3 milliseconds into an eel's electrical attack on a Goldfish, the fish floated passively with its body, tail, and fins all held rigidly. His research into Electric Eels thus began with the question: How can an Electric Eel's electricity temporarily stop a fish's muscles so quickly? To study the effect of an eel's electricity on a fish's muscles, he used a dead fish (with still working muscles) clamped to the bottom of an aquarium. The result was a "Eureka" moment and allowed for a battery of additional tests. Catania found that the conductive water provides an "antenna" by which the electricity extends from the eel into the fish to hijack its nervous system. Catania added other pieces to the Electric Eel puzzle. For example, he found that if an eel is uncertain if an object is alive and thus worth attacking, it can cause the potential prey to twitch. If it twitches, it is lunch. Catania ends the chapter with an experiment in which he measured the current from a small eel flowing through his own arm. Now he too has a personal appreciation for Electric Eels.

The final chapter takes us into the realm of zombies, featuring Catania's favorite insect, the Emerald Jewel Wasp, *Ampulex compressa*. In order to reproduce, the female Jewel Wasp must subdue an American Cockroach as food for its young (no other species of cockroach will do). Catania describes the process of zombification in delightful detail. The wasp leaps at the cockroach's shield on its upper back and delivers venom into the thorax (sensors on the stinger locate the first thoracic ganglion, thus paralyzing the front legs). Then, combining "the skills of a ballerina, fencer, and neurosurgeon," the wasp stabs her stinger into the soft tissues of the cockroach's throat and into the brain. She bites off half of each antenna and drinks the oozing blood (like a mosquito, she needs the blood proteins for egg production). She drags the zombified cockroach by its now stumpy antennae to a hole she has chosen. She lays an egg on the upper part of her victim's middle leg and then seals off the hole with debris, leaving the "zombified roach with a ticking time bomb glued to its leg." If all goes well for the wasp, within a few days it hatches into a ravenous grub that crawls inside the roach and feeds. A putrefying roach is a hostile environment, but the grub comes prepared with a cocktail of nine different antimicrobial compounds that soak the corpse with disinfectants. Once finished eating, the grub constructs a tough cocoon inside the roach, which it chemically bombs with a volatile antimicrobial. The resting wasp can rest well with its 3-pronged defense: fumigation, corpse sterilization, and antimicrobial cocoon. About a month later, an adult wasp emerges from the cockroach corpse. Catania's research question was how a cockroach might prevent this grim fate. The answer: vigorous defense involving kicking, dodging, raking, stabbing, and biting. I'll leave it to the reader to discover the details.

Catania has traveled beyond where most scientists tread: He has shared his captivating discoveries and how he made them with a general audience. He not only informs and delights, but also leads his readers through the process of discovery with such clarity that we share in the unraveling of the mysteries Catania finds so compelling. In the epilogue, Catania comments that his book would have been ten times longer if he had discussed all the false starts, failures, and interesting ideas that turned out not to be interesting after all. So as not to leave the reader with the misguided impression that research is always successful on the first try, Catania emphasizes that failure is a natural part of science (as it is in life). Discovery involves chance and serendipity. It requires keeping an open mind and minimizing preconceptions. Catania has proven to be a brilliant master of his own words of wisdom. I honestly cannot think of a single shortcoming regarding the book. It is superb! Catania is a brilliant writer and has boundless scientific curiosity—a winning combination. *Great Adaptations* is a treasure that belongs on every nature-lover's bookshelf or bedside table.

References

Darwin, C. 1881. *The Formation of Vegetable Mould Through the Action of Worms, with Observations on their Habits*. John Murray, London, viii, 326 p. [2].

Kaufmann, J.H. 1986. Stomping for earthworms by Wood Turtles, *Clemmys insculpta*: a newly discovered foraging technique. *Copeia* 1986(4):1001–1004.

Tinbergen, N. 1961. *The Herring Gull's World*. Basic Books, New York, xvi, 255 p.

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Bibliotheca Herpetologica

Vol. 14, 2020

Formerly the *International Society for the History and Bibliography of Herpetology Newsletter and Bulletin*

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